

A REVISION OF THE SPIDER GENUS *CALILEPTONETA* PLATNICK (ARANEAE, LEPTONETIDAE), WITH NOTES ON MORPHOLOGY, NATURAL HISTORY AND BIOGEOGRAPHY

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ABSTRACT. The spider genus *Calileptoneta* Platnick is revised and all species are described, diagnosed and keyed. A neotype for *Calileptoneta californica* (Banks) is designated and *Calileptoneta sylva* (Chamberlin & Ivie) is removed from synonymy with *Calileptoneta californica* (Banks). The female of *Calileptoneta noyoana* Gertsch and the male of *Calileptoneta sylva* (Chamberlin & Ivie) are described for the first time. Three new species are described: *Calileptoneta briggsi*, *Calileptoneta cokendolpheri*, and *Calileptoneta ubicki*. The morphology of *Calileptoneta* is discussed, and interpretive illustrations of male and female genitalia are provided. The natural history of *Calileptoneta* is presented with an account of the mating behavior for *C. ubicki*. The distribution of *Calileptoneta* species is discussed, and areas of endemism and potentially new *Calileptoneta* species are noted.

Keywords: Taxonomy, new species, USA, Leptonetidae

The first North American leptonetid, *Leptoneta californica* Banks, was described in 1908 and it was not until the time of Gertsch (1974) that the first effort to comprehensively treat the fauna was performed. Although detailed studies on the European fauna (Brignoli 1972, 1974, 1975, 1976, 1977, 1979a, 1979b, 1979c; Fage 1913; Machado 1941, 1945) revealed great genitalic diversity, Gertsch relied largely on somatic characters, resulting in an inadequate description of the fauna and a series of controversial taxonomic decisions (Brignoli 1977, 1979c; Platnick 1986). Platnick (1986) reassessed the higher-level taxonomy of the North American leptonetids by using a new suite of characters involving mid-dorsal integumentary glands and discovered support for the grouping of the North American fauna into four genera, confirming the opinions of Brignoli (1977, 1979c).

Little attention has since been paid to these spiders despite the problems found in Gertsch's (1974) monograph. Most taxa suffer from incomplete species descriptions and doubtful species limitations. Additionally, over 50% of the specimens studied by Gertsch (1974) are juveniles that cannot be diagnosed. This situation is especially troubling in western North America, where the bulk of lepto-

netid diversity is found in environmentally sensitive areas, and where a complete knowledge of these taxa may contribute to conservation efforts.

The major systematic problem of the North American leptonetids is an incomplete understanding of their genitalic morphology. A survey of the European literature reveals a variety of genitalic characters, especially on the male palpal bulb. None of the literature treating the North American fauna sufficiently illustrates the complexity of the male genitalia, and the females are ignored almost entirely. Not only does this lack of information miss a suite of informative characters, it may also underestimate the true diversity of the fauna.

This study reexamines the genus *Calileptoneta* Platnick 1986 and builds on the findings of Gertsch (1974) by using detailed genitalic examinations, natural history observations and additional specimens collected since his monograph. Three new species are described, including the first troglobitic *Calileptoneta*. Natural history observations are included, with the first account of the mating behavior of leptonetids and a description of their web architecture. The biogeography of *Calileptoneta* is also discussed, noting areas of endemism and localities that may yield additional species. It is

Table 1.—List of anatomical abbreviations used in the text and figures.

AC	apical constriction
AEG	anterior eye group
AER	anterior eye row
ALE	anterior lateral eyes
ALS	anterior lateral spinnerets
AME	anterior median eyes
AH	apical hook
AL	accessory lobe
E	embolus
OA	ocular area
OAL	ocular area length
OAW	ocular area width
PBP	proximal bulb process
PEG	posterior eye group
PF	proapical flange
PL	prolateral lobe
PLE	posterior lateral eyes
PLS	posterior lateral spinnerets
PMS	posterior median spinnerets
PS	paraembolar setae
RS	retroapical seta
S	spermathecae

the aim of this study to provide a guideline for the revision of the other North American leptonetids, and contribute to an eventual understanding of their phylogenetic history.

METHODS

Each species is thoroughly described, diagnosed, and keyed. Species descriptions refer to a single adult individual for each sex, which is identified as a type or by the locality at which it was collected. Descriptions of females and all previously unknown sexes were written using specimens collected in association with diagnosable individuals at or near the type locality. In cases of sympatry [*C. californica* (Gertsch 1974) and *C. helferi* Gertsch 1974)], descriptions were based upon associated individuals collected as close to the type locality as possible. Anatomical abbreviations used in the text are listed in Table 1. All measurements are in mm and quantify the size of a structure at its widest or longest point. A section reporting the variation in the most conspicuous and variable features follows each description and represents two to nine individuals (*n*), encompassing the full range in overall size. All illustrations are by Virginia Kirsch (VK) or myself (JL) and are attributed in the figure captions.

Prior to examination with a Hitachi S-520 or Leo 1450VP Scanning Electron Microscope, all structures were briefly cleaned in an ultrasonicator and critical point dried. Spinneret preparations followed the methods of Coddington (1989), consisting of a brief cleaning in an ultrasonicator and a gentle squeeze of the abdomen using forceps in order to extend and separate the spinnerets. Large structures were examined using Olympus SZH10 and Leica SMZ10 microscopes.

Vulvae were carefully excised and placed in a trypsin solution for 2–8 hours under a heat lamp to digest extraneous tissue. If characters remained unclear, the vulva was stained with Chlorazol Black and reexamined. Photographs were taken using an Olympus PM-10AK and a Nikon Coolpix 990 digital camera attached to a Nikon SL3D® microscope. All genitalia and small structures were placed in Hoyer's solution or glycerin and examined in temporary mounts following the procedure described by Coddington (1983), under a Nikon SL3D® microscope.

Palpal structures are provided names based on the nomenclature used by Gertsch (1974) and Platnick (1986), when the structure referred to was unambiguously identified. Structures not previously discussed in the literature treating the North American fauna were given names based on their relative location on the palpal bulb. I did not use names provided in literature treating the European or Asian faunas. Such a system would imply homology of structures where none is intended. It is not the aim of this study to establish a precedent for the nomenclature of leptonetid genitalia, except in that structures should be clearly labeled and illustrated.

The specimens on which this study was based were kindly provided by Norman Platnick, American Museum of Natural History (AMNH), Laura Leipensburger, Museum of Comparative Zoology (MCZ), Fred Coyle, Western Carolina University (WCU), James Cokendolpher, personal collection (JC), and Darrell Ubick, personal collection (DU). Additional material is from the collection of the California Academy of Sciences (CASC).

SOMATIC MORPHOLOGY

Cephalothorax.—The carapace (Figs. 8, 10) is domed and gently sloping posteriorly in lateral profile. The color is pale yellow with



Figure 1.—Web of *Calileptoneta ubicki* new species from Arroyo Seco Canyon. Scale bar = 2.0 mm.

purple-brown dusky markings surrounding the eyes and carapace margins. The fovea is a longitudinal purple-brown dusky band (Figs. 2, 4, 6). The eyes are relatively large (except in *C. briggsi* new species), and raised above the carapace in lateral profile (Figs. 8, 10). Seta-tion is minimal, although a series of thin, elongate setae occur posteriad of the PME, and a distinct pair of crossing setae are at the apex of the clypeus (Figs. 2, 4, 6). The sternum (Fig. 9) is slightly domed in lateral profile (Fig. 10) and the palpal coxae bear a ser-
rula extending the length of the anterior edge (Fig. 11). The chelicerae (Figs. 15–23) have a promargin with a single row of large teeth on a fine ridge, and a retromargin with 1–7 denticles. As with other leptonetids, the promargin bears a relatively large proximal tooth, although *C. noyoana* (Gertsch 1974) and *C. wapiti* (Gertsch 1974) males have a diagnostic enlarged tooth distally (Figs. 18, 19).

Legs.—The legs are long and thin with a regular series of slender spines on the tibiae and metatarsi and a single apical spine on the patellae (Figs. 3, 5, 7). Sexual dimorphism of the legs is minimal, with the leg length of

males only slightly longer than that in females. A point of weakness occurs at the patella-tibia joint, resembling linyphiid, hersiliid and filis-tatid spiders, and the legs are readily dropped distad of this joint by living specimens (pers. obs.). A small preening comb consisting of 6 paired setae occurs ventroapically on the meta-tarsus (Figs. 12, 13). The comb is often tucked into the tibia-metatarsus joint and may require the removal of one of the segments to be clearly viewed. Similar combs have also been re-corded in *Appaleptoneta* and *Neoleptoneta* (Cokendolpher pers. comm.) and may be a syn-
apomorphy uniting leptonetids as a whole. The integumentary glands discussed by Platnick (1986), occur middorsally on the femora, pa-tellae and tibiae of all legs, including the palpi. The sinuous patellar gland plates with large pores (Fig. 14) (Platnick, 1986 figs. 55–60) may indeed serve to unite *Calileptoneta*, although several other gland types were found on *Calileptoneta* species. No less than four dif-ferent types of glands were found on the legs of *Calileptoneta sylvia* (Chamberlin & Ivie 1942), including gland types suggested as syn-
apomorphies for other taxa by Platnick (1986)

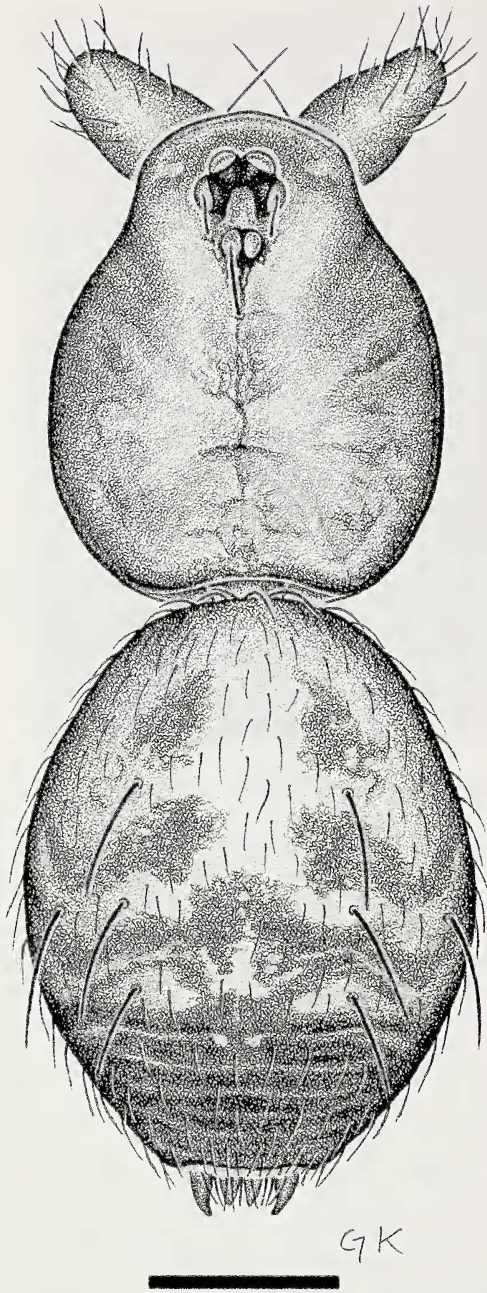


Figure 2.—*Calileptoneta ubicki* new species, male, dorsal from Arroyo Seco Canyon. Scale bar = 0.5 mm. Illustration by VK.

(Ledford & Ubick, pers. obs.). The tarsal claws are simple, with few teeth.

Abdomen.—The abdomen (Figs. 2–7) is oval in shape, with several long, slender setae dorsally. The color is pale with a series of dusky chevron markings. These markings

were used by Gertsch (1974) to diagnose species (especially juveniles) but I found them highly variable within species.

Spinning organs.—The spinnerets (Figs. 24–31) of *Calileptoneta* are typical of other leptonetids and do not substantially differ from the findings of Platnick et. al. (1991). The ALS (Figs. 25, 30) are circular in apex outline, with 6–10 pustulose tartipores. The posterior spinnerets (Figs. 26, 27, 31) are highly modified, forming elongate, narrow tetrahedrons bearing 1–2 rows of spigots with short, circular bases and narrow shafts. The PLS of females bear 1–2 elongate spigots with thick shafts (Fig. 31) that presumably serve the cylindrical glands (Platnick et. al. 1991). No such spigots were found in males, nor were any nubbins. A series of four epiandrous spigots (Fig. 28) occur at the apical edge of the epigastric furrow in males.

GENITALIA

Male.—The male genitalia (Figs. 32–94) of *Calileptoneta* are intricate structures that require careful observation under compound microscopy in order to be viewed properly. The palpal segments vary greatly in length, with some species (*C. helferi*, *C. noyoana*) having elongate femora and patellae (Figs. 5, 7) several times the carapace width. The palpal tarsus bears an apical constriction (AC, Figs. 32, 35, 38) with a single seta retroapically (retroapical seta, RS, Figs. 33, 37, 39). Small groups of modified setae occur on the retrolateral surfaces of the tibiae and tarsi (Figs. 37, 40, 68, 71, 86, 92). Spinination is variable with *C. briggsi*, *C. californica*, *C. helferi* and *C. sylvia* bearing numerous spines on the pro- and retrolateral surfaces of the palpal femora (Fig. 7), and *C. cokendolpheri* new species, *C. noyoana*, *C. oasa* (Gertsch 1974), and *C. ubicki* new species, lacking palpal spines entirely (Figs. 3, 5). The bulb is suboval in shape and lightly sclerotized. As reported by Brignoli (1979c), the bulb is expandable, and may rotate up to 90° during mating. An unusual prolongation of the palpal bulb (proximal bulb process, PBP, Figs. 38–40, 41–43, 47–49, 59–61, 77–79) extends proximally on *C. briggsi*, *C. californica* (Gertsch, 1974), *C. helferi* and *C. sylvia*, and may function as an anchoring point during mating. The prolateral lobe (PL, Figs. 32, 35, 38), first proposed as a synapomorphy for *Calileptoneta* by Platnick (1986), is a dorsal ex-



Figure 3.—*Calileptoneta ubicki* new species, male, lateral from Arroyo Seco Canyon. Scale bar = 1.0 mm. Illustration by VK.

tension of the bulb (not the tarsus) that may serve as a point of rotation during bulb expansion. An accessory lobe (AL, Figs. 46, 82) occurs distad of the PL, and gradually tapers into a small hook at its apex (apical hook, AH, Figs. 35, 38, 46, 52, 56, 82, 87, 94). The ventroapical surface of the bulb is divided by a narrow ridge (Fig. 45) that is produced into a translucent, spoon-shaped, proapical flange with serrate edges (proapical flange, PF, Figs. 33, 36, 39). The prolateral surface of the ridge is deeply striate (Figs. 45, 46, 51, 52, 63, 64, 76, 82), composed of numerous laterally fused setae. The embolus (E, Figs. 33, 36, 39) is situated ventroapically and tapers into a point (Figs. 75, 76) or a broad fork (Fig. 46). An adjacent group of twisted circular or fan-like setae (paraembolar setae, PS, Figs. 32, 34, 35, 38, 39) occur prolaterad of the embolus and may be the remnants of the laterally fused setae on the prolateral surface of the bulb. The tarsal organs (Figs. 95–97) of *Calileptoneta* are cylindrical structures situated at the apex of the palpal tarsus, and vary in the degree by which they extend from the tarsus.

Female.—The female genitalia (Figs. 98–118) of *Calileptoneta* are relatively uniform, and of little diagnostic value. Although many diagnostic characters were discussed by Gertsch (1974), most of his illustrations were drawn incorrectly and are misleading. The lack of diagnostic information in females was especially problematic during the course of this study, and all species except for *C. cokendolpheri*, *C. oasa* and *C. ubicki* remain undiagnosable in the absence of associated males. The atrium is triangular or trapezoidal with a dense network of striae (Figs. 102, 104, 106, 109–118) ventrally and a lateral pair of tightly twisted spermathecae (S, Figs. 98, 101) that connect dorsally via a sharp bend (Figs. 101, 107, 108). This bend is often difficult to observe and requires careful preparation to be viewed clearly (see Methods section for a discussion of techniques that aid in the examination of leptonetid genitalia). Two species, *C. oasa* and *C. ubicki*, have an atrium with a distinctive apical bifurcation (AB, Figs. 98, 102, 104) although this is less pronounced in *C. oasa*.

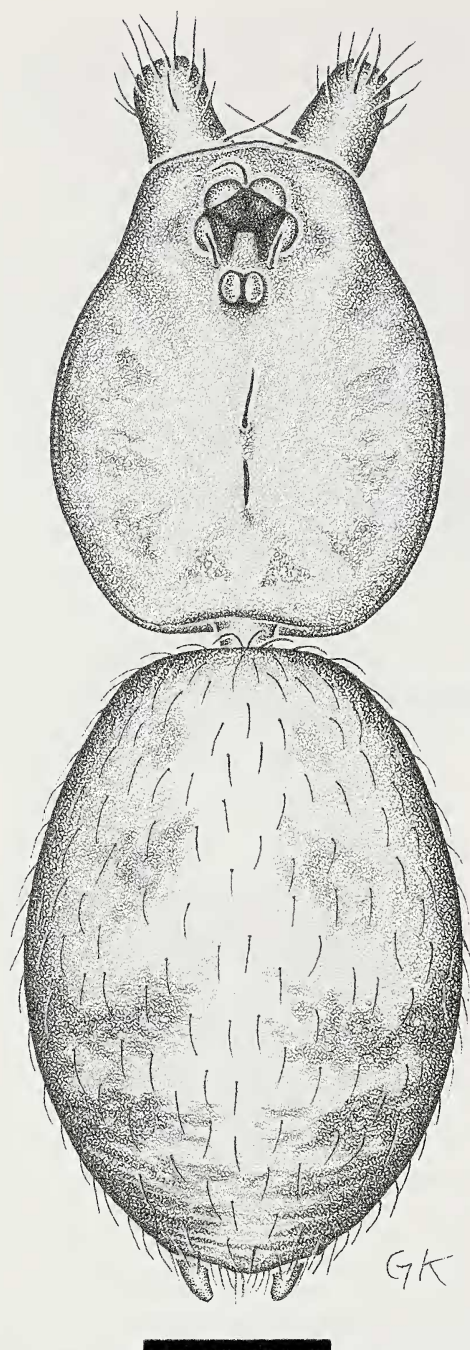


Figure 4.—*Calileptoneta noyoana* (Gertsch), male, dorsal from Fort Bragg. Scale bar = 0.5 mm. Illustration by VK.

NATURAL HISTORY

General behavior and web architecture.—*Calileptoneta* are small spiders, generally restricted to cool, moist microenviron-

ments such as caves, leaf-litter and deeply imbedded rock outcrops. They are rarely collected due to their cryptic nature and temporal occurrence, especially in areas that are seasonally arid. Individuals appear to congregate in ideal habitats and, at the correct time of year, may be collected in large series. The web (Fig. 1) of *Calileptoneta* is a rectangular, finely woven sheet 3–4 cm in diameter, presumably constructed with the highly modified PLS. Individuals hang beneath the sheet and readily drop from the web into a defensive posture whereby the legs are drawn close to the body when disturbed (pers. obs.).

Mating behavior.—A captive group of *C. ubicki* were kept in a small plastic container containing sphagnum moss and fed a diet of freshly killed *Drosophila* for several months. Up to 7 individuals occupied the same container and overlapping sheet webs were constructed with individuals often resting in close proximity. An adult pair of *C. ubicki* was removed from the group and several instances of mating were recorded. Courtship displays consisted of a slight plucking of the female's web by the male using his palpi. Both individuals remained inverted beneath the sheet as the male slowly approached. Upon contact, a single palpal bulb rotated 90° before being inserted into the atrium and then exchanged for the other bulb. Alternate bulb insertion lasted approximately 5–10 seconds and mating was completed after 30 minutes. The male situated himself in the female's web for several hours following mating. No sperm web was recorded for the male and the female did not construct any eggsacs.

BIOGEOGRAPHY

The distribution of *Calileptoneta* (Figs. 119–122) is largely vicariant with most species restricted to a particular locality or habitat type. This is not surprising given their general biology and the similar patterns of endemism exhibited by other leptonetid taxa (Brignoli 1974, 1977; Gertsch 1971). Sympatric populations are known, however, and a strict hypothesis of vicariance may be premature given the poor sampling in central Oregon, eastern California and southern California (Fig. 122).

The restriction of *Calileptoneta* species to specific habitat types is of special interest as environmental concerns are paramount in California and Oregon. Of particular importance

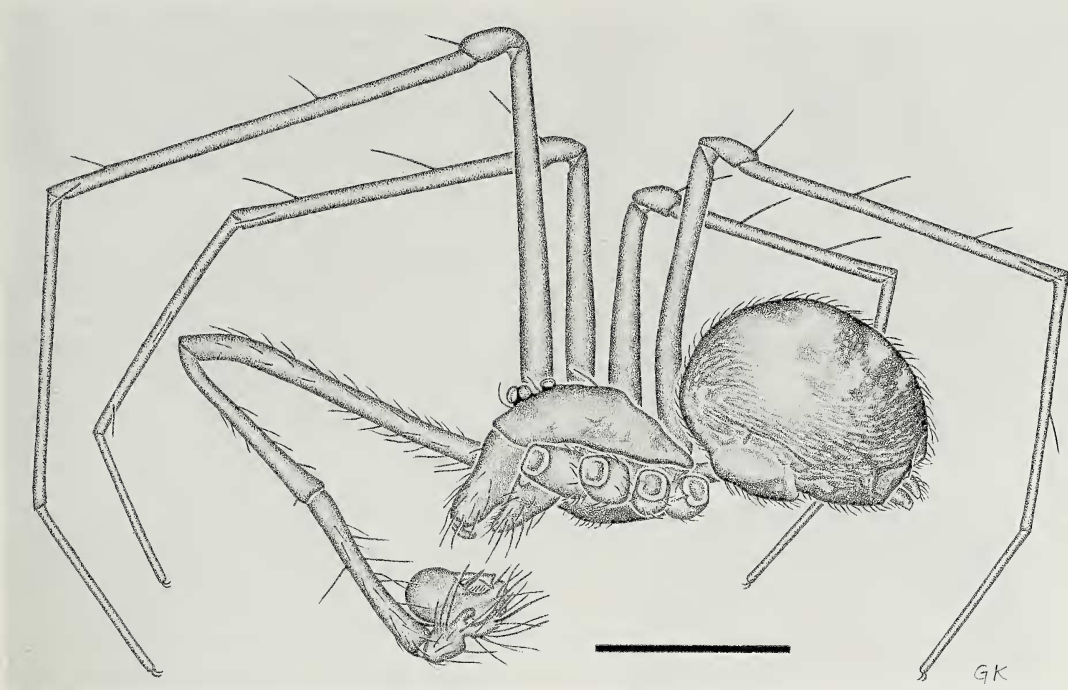


Figure 5.—*Calileptoneta noyoana* (Gertsch), male, lateral from Fort Bragg. Scale bar = 1.0 mm. Illustration by VK.

are the distributions of *C. noyoana* and *C. cokendolpheri*, which are endemics of economically important forest types—redwood forest and Douglas Fir forest, respectively. Although not particularly charismatic, nor common enough for use as indicators, these species contribute to the knowledge of biodiversity in these forests and may assist conservation efforts.

Troglobitic species regularly receive special conservation status due to their extremely limited distributions and sensitivity to disturbance. It is surprising that only a single troglobitic *Calileptoneta* is known, despite California's rich cave fauna and in contrast to the other major karst regions in the Nearctic, Texas and Appalachia, which have numerous cavernicolus leptonetids. In California, this niche appears to be occupied by the many cavernicolus telemids, which do not occur in the eastern United States (D. Ubick pers. comm.). *Calileptoneta briggsi* is restricted to a poorly known cave system that receives little attention from cavers and is probably not at risk. Additional troglobitic *Calileptoneta* almost certainly occur, and indeed two female

specimens have been collected in caves from Calaveras and Tulare counties in eastern California (Fig. 122). Given the large disjunction between these specimens and other known populations of *Calileptoneta*, they almost certainly represent new species.

Undiagnosable females and juveniles (Fig. 122) provide additional interesting distributional data for *Calileptoneta*. Not only do these specimens contribute to a broader understanding of the distribution of *Calileptoneta*, they reveal distributional gaps that may yet yield additional species. The gap in southern California is the most striking, with only two species, *C. ubicki* and *C. oasa*, known from the entire southern half of the state. The seasonally arid climates of these areas makes the collection of specimens unpredictable, but given the habitat diversity and faunistic richness of these areas, the possibility of this being a natural distributional gap is unlikely. The large gap in Oregon from Josephine County to Lane County is also probably artificial considering the rich oak woodland and riparian areas that occur between these two counties.

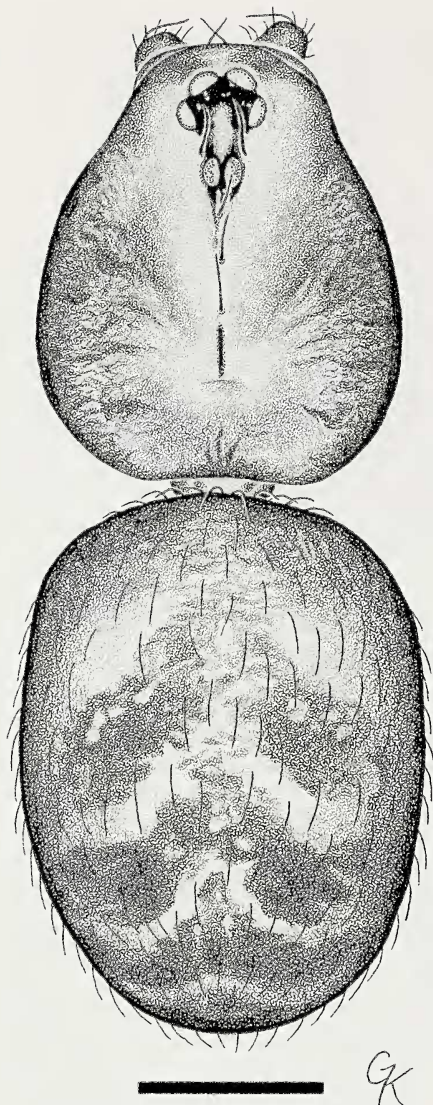


Figure 6.—*Calileptoneta helferi* (Gertsch), male, dorsal from Mt. Diablo. Scale bar = 0.5 mm. Illustration by VK.

DISCUSSION

Perhaps the largest remaining gap in the knowledge of the North American leptonetids is an understanding of their phylogenetic affinities. Not only would a phylogeny for these spiders reveal interesting evolutionary patterns within North America, it would also contribute to an understanding of leptonetid relationships as a whole. Such a study would require a comprehensive review of all North American leptonetid genera, and inclusion of potential European and Asian outgroup taxa,

which is beyond the scope of this study. The relationships within *Calileptoneta* also need further investigation and future work will be directed at this goal. Additional fieldwork is prerequisite to this understanding, especially in the distributional gaps of central Oregon, southern California and eastern California. Additional specimens will also facilitate the diagnosis of females, particularly between *C. briggsi*, *C. californica*, *C. helferi* and *C. noyoana*. The recollection of *C. wapiti* also must take priority, as will the discovery of males at cave sites in Calaveras and Tulare counties.

TAXONOMY

FAMILY LEPTONETIDAE

Genus *Calileptoneta* Platnick 1986

Leptoneta (in part): Banks 1910: 6; Brignoli 1977: 215–217; Comstock 1913: 307; Fage 1913: 566; Moles 1921: 40; Gertsch 1974: 191–192.
Calileptoneta Platnick 1986: 15; Platnick 2002.

Type species.—*Leptoneta californica* Banks 1904: 333, by original designation.

Diagnosis.—Distinguished from other North American leptonetid genera (*Archoleptoneta* Gertsch 1974, *Neoleptoneta* Brignoli 1972, *Appaleptoneta* Platnick 1986) by having a prolateral lobe on the male palpal tarsus (Figs. 32, 35, 38) and by the sinuous patellar gland plates bearing large pores (Fig. 14, Platnick 1986, figs. 55–60).

Description.—Total length 1.20–3.04. Carapace oval in dorsal view (Fig. 8), length 1.20–1.32 × width, height 0.26–0.54 × width; smooth; thoracic fovea a thin dusky band (Figs. 2, 4, 6); carapace posterior margin straight to sinuous (Figs. 2, 4, 6, 8); carapace with 2 setae posteriad of AER, 3 setae posteriad of PME, extending linearly to fovea; clypeus with 2 setae crossing distally (Figs. 2, 4, 6); six eyes, PME absent; AEG with dark markings surrounding eyes, u-shaped at posterior margin (Figs. 2, 4, 6, 8); PEG with dark circular markings surrounding eyes (Figs. 2, 4, 6); OA longer than wide, OAL 0.60–1.40 × OAW, PME 0.40–0.70 × PLE interdistances; clypeal height 0.70–1.02 × PME diameter, chelicerae unmodified, fang furrow a narrow ridge with 3–9 large teeth, retromargin with 1–5 denticles (Figs. 15–23). Sternum smooth, oval, broadly rounded posteriorly, margin entire, length 1.0–1.2 × width. Abdomen (Figs. 2, 4, 6) oval, pale, with dusky

chevron markings, and covered with fine, elongate setae. Spinning organs (Figs. 24–31) with the ALS not modified and bearing several pustulose tartipores; PMS and PLS highly modified, tetrahedral, forming a narrow ridge on surface; PMS with 2 longitudinal rows, and PLS with a single longitudinal row of spigots on short, circular bases; prolateral edge of PLS in females with 2 isolated spigots on elongate, thick bases (Fig. 31); males with 4 epiandrous spigots (Fig. 28) at the apex of the epigastric furrow. Leg formula I, IV, III, II; elongate and thin; femur I of males $2.09\text{--}3.4 \times$ carapace width, females $1.32\text{--}2.71 \times$ carapace width; middorsal integumentary glands sinuous, with large pores (Fig. 14); preening comb consisting of 6 paired setae at the apices of the metatarsi on legs I–IV (Figs. 12, 13); autospasy occurs at patella-tibia joint. Leg spination I–IV: patella d1, tibia d1–1, p1, r1. Male palpal femur length $0.67\text{--}2.78 \times$ carapace width; palpal tarsus with a retroapical

seta (Figs. 33, 37, 39). Bulb expandable, lightly sclerotized, suboval, longer than wide, length $0.40\text{--}2.20 \times$ tibia length; with a fine ridge ventroapically, and a transparent proapical flange with serrate edges (Figs. 33, 36, 39); prolateral surface bearing a large lobe (Figs. 32, 35, 38), with a small lobe apicad (Figs. 46, 82) that is produced distally into a hook (Figs. 35, 38, 46, 52, 56, 64, 82, 87, 94); embolus ventrally situated (Figs. 33, 36, 39), with a prolateral group of twisted circular or fan-like paraembolar setae (Figs. 32, 34, 35, 38, 39); tarsal organ (Figs. 95–97) cylindrical. Female genitalia (Figs. 98–118) with a triangular or trapezoidal atrium, length $0.72\text{--}1.12 \times$ width, densely striate on ventral surface; spermathecae situated laterally, elongate, twisted, attaching to atrium dorsally by a sharp lateral bend (Figs. 101, 107, 108).

Distribution.—Southern California (Riverside County) to Central Oregon (Lane County) (Figs. 119–122).

KEY TO SPECIES OF THE GENUS *CALILEPTONETA*

The key has been written to maximize accuracy and efficiency. Multiple features are presented in each couplet in order to assist the identification of variable and poorly preserved specimens. Most taxa require high magnification under compound microscopy to insure positive identification.

Males

1. Proximal bulb process present (Figs. 38–40), retroapical seta straight (Figs. 33, 39), pro- and retrolateral surfaces of palpal femur heavily spined (Fig. 7) 2
 Proximal bulb process absent (Figs. 32–37), retroapical seta straight to curved (Fig. 37), palpal femur weakly spined or lacking spines entirely (Figs. 3, 5) 5
2. Proximal bulb process elongate, length $1.0\text{--}2.04 \times$ bulb width (Figs. 47–49, 59, 61), accessory lobe reduced (Figs. 52, 64) 3
 Proximal bulb process shorter, length $0.55\text{--}1.0 \times$ bulb width (Figs. 41–43, 77–79), accessory lobe normal (Figs. 46, 82) 4
3. Palpal tibia elongate, length $1.02\text{--}1.19 \times$ carapace width, proximal bulb process extending $\frac{1}{2}\text{--}\frac{3}{4}$ length of tibia, bulb length $0.81\text{--}1.04 \times$ tibia length (Figs. 6–7, 59–64), body darkly pigmented *C. helferi* (Gertsch)
 Palpal tibia shorter, length $0.76\text{--}0.90 \times$ carapace width, proximal bulb process extending entire length of tibia, bulb length $1.09\text{--}1.40 \times$ tibia length (Figs. 47–52), body lightly pigmented *C. californica* (Banks)
4. Body pigmentation entirely lacking, eyes reduced and flattened, femur I elongate, length $2.88\text{--}3.40 \times$ carapace width; proximal bulb process longer, length $0.85\text{--}1.0 \times$ bulb width (Figs. 41–43), embolus apically forked (Fig. 46) *C. briggsi* new species
 Body darkly pigmented, eyes normal, diameter PME $0.50\text{--}0.64 \times$ PLE interdistances; proximal bulb process shorter, with slight retrolateral bend (Fig. 78), length $0.55\text{--}0.86 \times$ bulb width (Fig. 79) *C. sylvia* (Chamberlin & Ivie)
5. Palpal tarsus with a retrolateral pair of twisted setae (Figs. 37, 65–70, 92), chelicerae with an enlarged distal tooth (Figs. 18, 19), retrodistal cheliceral process absent 6

- Palpal tarsus lacking twisted setae, chelicerae without an enlarged distal cheliceral tooth (Figs. 15–17, 20–23), retrodistal cheliceral process present (Fig. 16) or absent 7
6. Palpal segments elongate, femur length $2.24\text{--}2.78 \times$ carapace width (Figs. 5, 65–70)
 *C. noyoana* (Gertsch)
 Palpal segments normal, femur length $0.63\text{--}1.0 \times$ carapace width (Fig. 89–94)
 *C. wapiti* (Gertsch)
7. Bulb bearing two proapical flanges; proximal flange setose, distal flange tightly curled (Fig. 54); embolus hook-shaped (Fig. 56) *C. cokendolpheri* new species
 Bulb with single proapical flange, lacking setae, apex loosely to tightly curled (Figs. 75, 76, 88), embolus tapering to fine point (Figs. 75, 76) 8
8. Retrodistal cheliceral apophysis present (Fig. 16), with a whip-shaped seta retroapically on the palpal tibia (Fig. 86), proapical flange sinuate (Fig. 88) *C. ubicki* new species
 Retrodistal cheliceral apophysis absent (Fig. 15), with a hook-shaped seta retroapically on the palpal tibia (Fig. 71), proapical flange straight (Fig. 75) *C. oasa* (Gertsch)

Females

1. Atrium with an apical bifurcation (Figs. 98, 102, 104)
 *C. oasa* (Gertsch), *C. ubicki* new species
 Atrium entire (Figs. 99, 100, 106, 109–118) 2
2. Atrium (Figs. 99, 100, 106, 109–116) distinctly triangular, tapering to a point apically, with normal base
 . . . *C. briggsi* new species, *C. californica* (Banks), *C. helferi* (Gertsch), *C. noyoana* (Gertsch),
C. wapiti (Gertsch)
- Atrium (Fig. 117–118) trapezoidal, apically subquadrate, with broad base, atrium length $0.72\text{--}0.81 \times$ width *C. cokendolpheri* new species

Calileptoneta briggsi new species Figs. 22, 41–46, 111, 112, 121

Type material.—Male holotype from Indian Valley Creek Cave, Trinity County, California, USA, $40^{\circ}37'N$, $123^{\circ}27'W$, 27 October 1990, D. Ubick, W. Rauscher (CASC). Paratypes: USA: *California*: 2♂, 5 ♀, same data as holotype (CASC; 1 ♂, 1 ♀, DU).

Other material examined.—USA: *California*: Trinity County: Indian Valley Creek Caves, 4 air miles SSE. Hyampom, $40^{\circ}37'N$, $123^{\circ}27'W$, ~1800 ft. elevation, 5 July 1980, T. Briggs, W. Ma, W. Rauscher (2 ♀, 1 juvenile, AMNH), 27 October 1990, D. Ubick, W. Rauscher (4 juveniles, CASC), 31 August 1996, D. Ubick (2 juveniles, DU); Lower Butter Creek Cave, $40^{\circ}37'N$, $123^{\circ}27'W$, 5 July 1980, T. Briggs, W. Ma, W. Rauscher (2 ♀, 4 juveniles, AMNH).

Etymology.—This species is named in honor of Dr. Tom Briggs, discoverer of this and many other troglobitic arachnids throughout California.

Diagnosis.—Distinguished from all other *Calileptoneta* by lacking pigmentation and having the eyes greatly reduced and flattened.

Calileptoneta briggsi may be further separated from other *Calileptoneta* males, except *C. californica*, *C. helferi* and *C. sylvia*, by having a proximal bulb process (Figs. 38–43), and a straight retroapical seta (Figs. 39, 48); from *C. californica* and *C. helferi* by having the proximal bulb process (Figs. 77–79) short, process length $0.85\text{--}1.08 \times$ bulb width, and having the prolateral apical lobe large (Figs. 46, 82); from *C. sylvia* by having an elongate femur I, length $2.88\text{--}3.40 \times$ carapace width, and an apically forked embolus (Fig. 46).

Male (holotype).—Total length 2.64. Specimen pale, entirely lacking pigmentation. Carapace 1.19 long, 0.93 wide, height at fovea $0.33 \times$ carapace width; clypeus 0.17 high, chelicerae 0.66 long, fang furrow with 9 teeth on a narrow ridge and 5 denticles on retromargin (Fig. 22). Ocular area 0.23 long, 0.17 wide; diameter PME $0.50 \times$ PLE interdistances. Sternum 0.65 long, 0.17 wide; labium 0.08 long, 0.16 wide; palpal coxae 0.54 long, 0.20 wide.

Spinination: palpus: femur p1-1-2-1-2-2-2-2-3-4-1, r3-2-1-1-2-3-2; patella d1; tibia r3; tarsus r1 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [To-

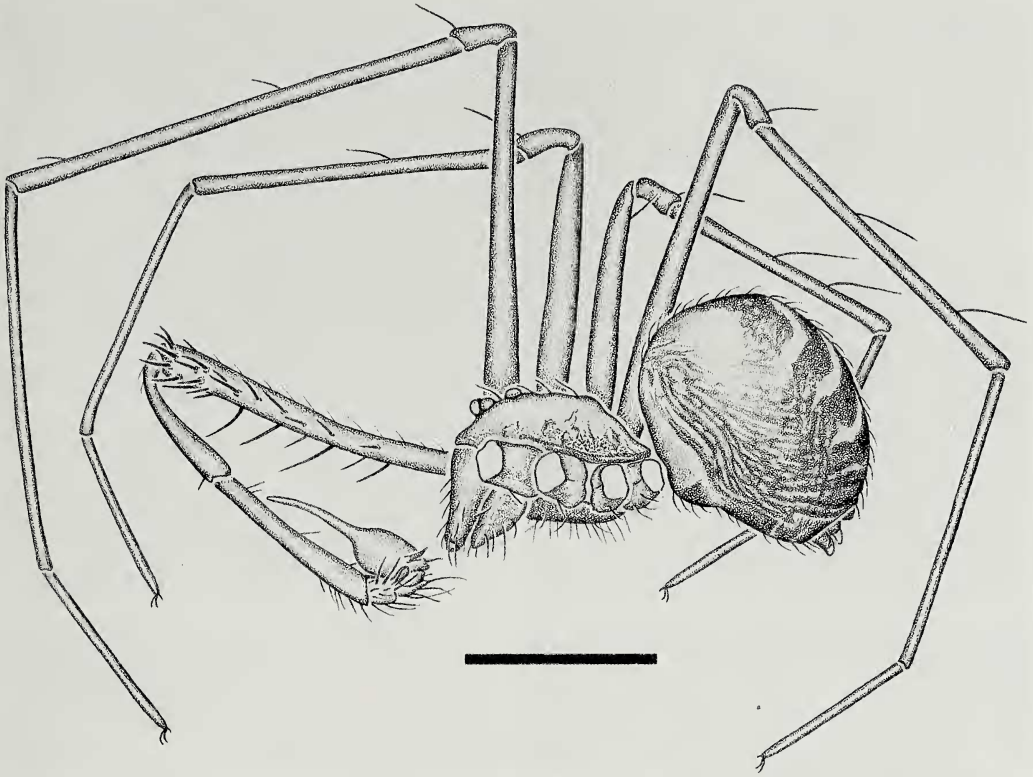


Figure 7.—*Calileptoneta helferi* (Gertsch), male, lateral from Mt. Diablo. Scale bar = 1.0 mm. Illustration by VK.

tal]); I: $3.17 + 0.39 + 2.80 + 2.24 + 1.34 = [9.95]$; II: $1.90 + 0.34 + 2.04 + 1.73 + 1.10 = [7.12]$; III: $1.70 + 0.27 + 1.59 + 1.46 + 0.90 = [5.90]$; IV: $2.10 + 0.32 + 2.15 + 1.93 + 1.15 = [7.65]$; pedipalpus: $1.08 + 0.44 + 0.66 + 0.41 = [2.60]$. Femur I $3.40 \times$ carapace width, palpal femur $1.16 \times$ carapace width.

Palpal bulb (Figs. 41–46) 0.79 long, 0.27 wide; palpal tibia with a retroapical group of stiff setae; proximal bulb process (Figs. 41–43) short, reaching to base of tibia, bulb length $0.98 \times$ length tibia; embolus broadly forked at apex (Fig. 46); paraembolar setae circular, distally broad, reaching slightly beyond base of fork on embolus (Fig. 46); accessory lobe large (Fig. 46).

Abdomen pale, without pattern, 1.45 long, 1.22 wide.

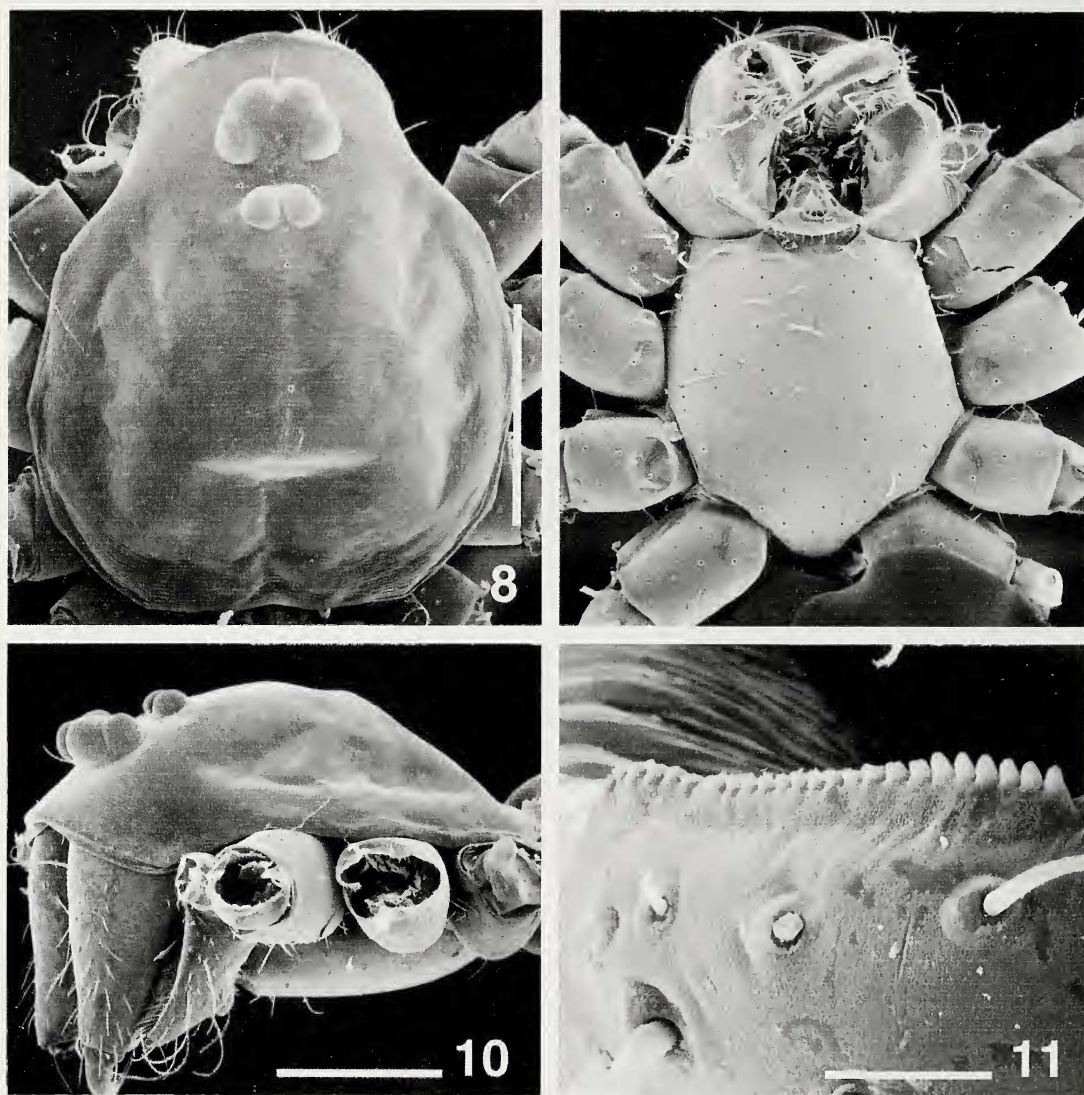
Variation ($n = 2$).—Total length 2.05–2.64; carapace length $1.24\text{--}1.31 \times$ carapace width; OAL $1.35\text{--}1.77 \times$ OAW, diameter PME $0.40\text{--}0.53 \times$ PLE interdistances; length

femur I $2.10\text{--}3.40 \times$ carapace width, palpal femur $0.91\text{--}1.20 \times$ carapace width; palpal bulb length $1.15\text{--}1.36 \times$ palpal tibia length; proximal bulb process length $0.85\text{--}1.08 \times$ bulb width.

Female (paratype).—Total length 2.90. Coloration and markings same as male.

Carapace 1.2 long, 0.93 wide, height at fovea $0.34 \times$ carapace width; clypeus 0.17 high, chelicerae 0.65 long, fang furrow with 8 teeth on a narrow ridge and 4 denticles on retro-margin (Fig. 22). Ocular area 0.11 long, 0.18 wide; diameter PME $0.50 \times$ PLE interdistances. Sternum 0.77 long, 0.70 wide; labium 0.14 long, 0.20 wide; palpal coxae 0.49 long, 0.23 wide.

Spinination: palpus: patella d1 (apical), tarsus p3-1-1, r1-4, v1. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $2.32 + 0.34 + 2.93 + 1.98 + 1.27 = [8.84]$; II: $1.93 + 0.34 + 1.98 + 1.63 + 1.02 = [6.9]$; III: $1.63 + 0.29 + 1.49 + 1.46 + 0.90 = [5.77]$; IV: $2.15 + 0.29 + 2.10 + 1.88$



Figures 8–11.—*Calileptoneta* sp., female from Mt. Diablo. 8. Carapace, dorsal. 9. Cephalothorax, ventral. 10. Cephalothorax, lateral. 11. Right palpal coxa showing serrula. Scale bars: A–C = 270 μ m, D = 20 μ m.

+ 1.12 = [7.54]; pedipalpus: 0.80 + 0.23 + 0.61 + 0.70 = [2.34]. Femur I 2.50 \times carapace width, palpal femur 0.86 \times carapace width.

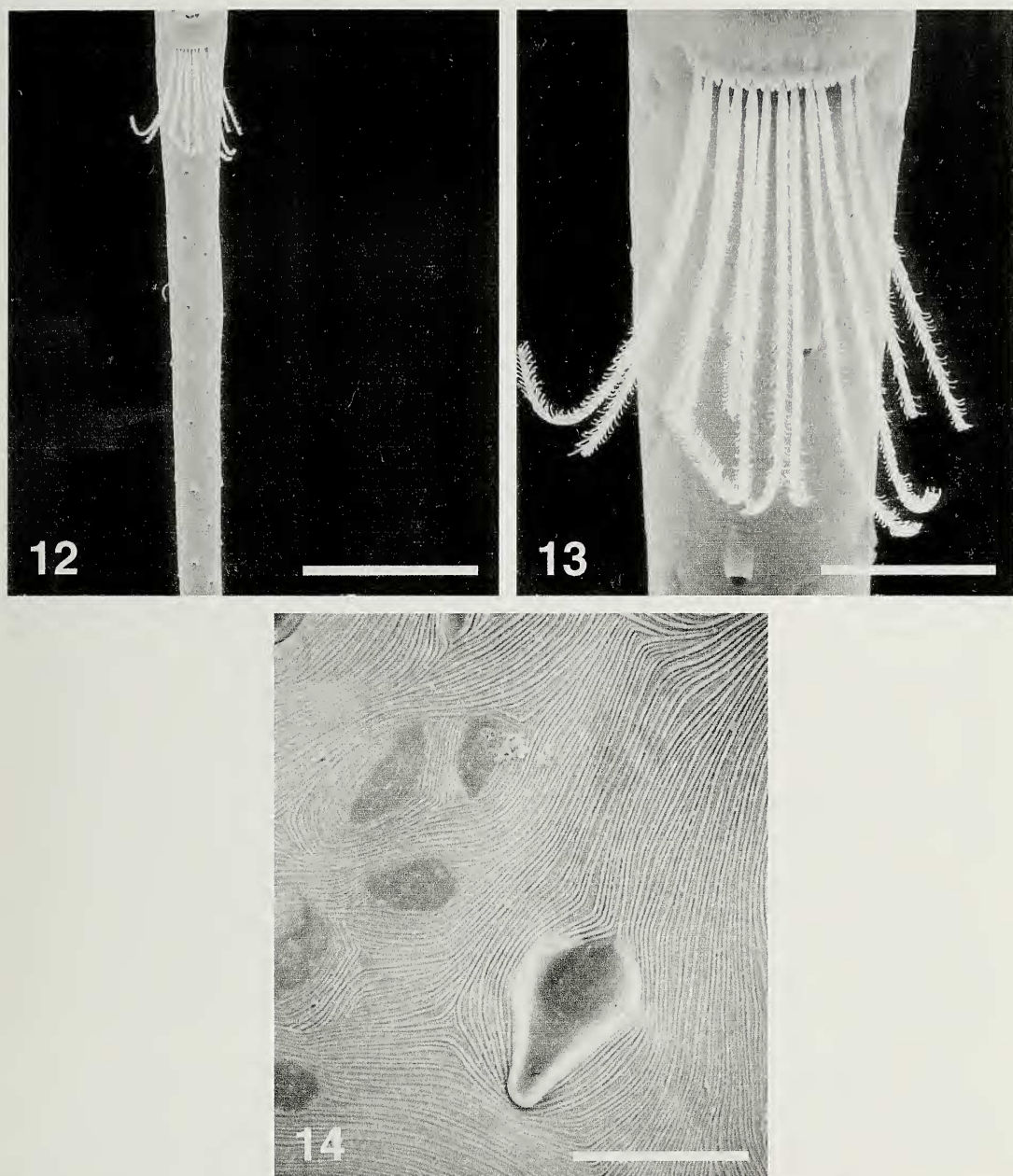
Abdomen pale, without pattern, 1.7 long, 1.35 wide. Atrium 0.18 long, 0.23 wide, spermathecae 0.18 long (Figs. 111–112).

Variation ($n = 3$).—Total length 2.63–3.04; carapace length 1.26–1.32 \times carapace width; OAL 0.60–1.45 \times OAW, diameter PME 0.40–0.50 \times PLE interdistances; length femur I 2.5–2.71 \times carapace width, palpal femur 0.82–0.89 \times carapace width; atrium

length 0.78–0.91 \times width, spermathecae 0.78–0.80 \times atrium width.

Natural history.—These spiders were collected hanging from sheet webs among a root mass in the cave's dark zone. Given the lack of pigmentation, reduced eyes, and elongate legs of this species, it is considered a troglobite.

Distribution.—Known only from Indian Valley Creek Caves which include Indian Valley Creek Cave and the adjacent Lower Butter Creek Cave in Trinity County (Fig. 121). These caves occur along a continuous band of



Figures 12–14.—*Calileptoneta* sp., female from Mt. Diablo. 12–13. Left metatarsus III, showing preening comb. 14. Middorsal integumentary gland, left leg III. Scale bars: A = 150 μm , B = 38 μm , C = 7.5 μm .

limestone and were presumably once connected (T. Briggs, D. Ubick pers. comm.).

Calileptoneta californica (Banks 1904)

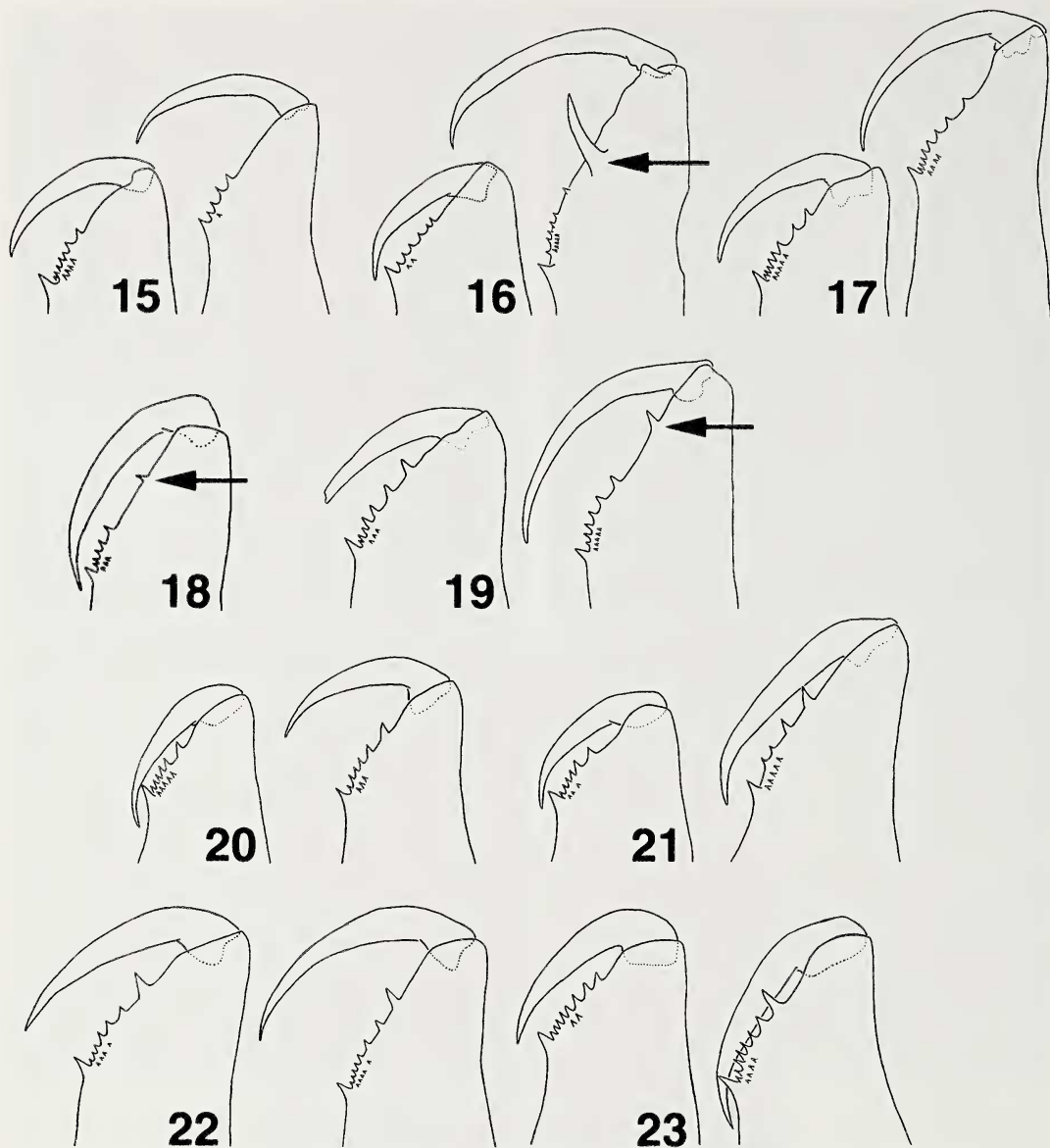
Figs. 20, 38–40, 47–52, 115, 116

Leptoneta californica Banks 1904: 333; Banks 1910: 6; Brignoli 1977: 217; Comstock 1914:

307; Fage 1913: 566; Moles 1921: 40; Gertsch 1935: 21; Gertsch 1974: 191–192.

Calileptoneta californica (Banks): Platnick 1986: 15. Platnick 2002.

Type material.—Female holotype, Mt. Diablo, Contra Costa County, California,



Figures 15–23.—*Calileptoneta* species, left chelicerae, female, male. 15. *C. oasa* (Gertsch) from Andreas Canyon. 16. *C. ubicki* new species from Arroyo Seco Canyon, arrow to retrodistal cheliceral apophysis. 17. *C. cokendolpheri* new species from H. J. Andrews. 18. *C. wapiti* (Gertsch) holotype, arrow to distal tooth. 19. *C. noyoana* (Gertsch), female from Fort Bragg, male holotype, arrow to distal tooth. 20. *C. californica* (Banks), female from Bell Station, male from Mt. Diablo. 21. *C. helferi* (Gertsch), female from Claremont Ave., male holotype. 22. *C. briggsi* new species from Indian Valley Creek Cave. 23. *C. sylvia* (Chamberlin & Ivie), female holotype, male from Samwell Cave. Illustrations by JL.

USA, 37°51'N, 121°55'W, June, Fuchs (CASC, lost in 1906 fire).

Male neotype, Mt. Diablo State Park, BBQ/ Wildcat Group Camp, Contra Costa County, California, USA, 37°51'N, 121°55'W, 22 January 2000, J.M. Ledford, under stones (CASC);

Other material examined.—USA: *California*: Contra Costa County: Mt. Diablo State Park, BBQ/ Wildcat Group Camp, 37°51'N, 121°55'W, 22 January 2000, J.M. Ledford, under stones (1 ♂, CASC); Napa County: 2 miles W. Oakville, 38°26'N, 122°24'W, 31 Dec. 1953, V. Roth (1 ♂, 1 ♀, AMNH); Santa

Clara County: 9.0 miles N. Bell Station, 37°02'N, 121°18'W, oak grove, under schist, 10 February 1991, D. Ubick (1 ♂, 2 ♀, DU).

Designation of neotype.—The holotype of *L. californica* was lost in the California Academy of Sciences during the 1906 earthquake and fire. Many additional specimens have since been collected at the type locality, Mt. Diablo. However, this locality represents an area of sympatry between *C. californica* and *C. helferi* (Fig. 120). *Calileptoneta californica* is by far the rarest of the two species with only two male specimens known from this locality. Gertsch (1974) assigned males with the palpal bulb process reaching the tibia (Figs. 47–52) to *C. californica* and I maintain the association. In order to define this species objectively and clarify its taxonomic status a male from Mt. Diablo conforming to both Banks' (1904) and Gertsch's (1974) description of *C. californica* is designated as a neotype and deposited at the California Academy of Sciences (ICZN 2000, Article 28).

Diagnosis.—Distinguished from other *Calileptoneta*, except *C. briggsi*, *C. helferi* and *C. sylva*, by males having a proximal bulb process (Figs. 38–40, 47–49), and a straight retroapical seta (Figs. 39, 48); from *C. briggsi* and *C. sylva* by having the proximal bulb process (Figs. 47–49) elongate, process length 1.0–2.04 × bulb width and having the accessory lobe reduced (Fig. 52); from *C. helferi* by having a shorter palpal tibia, length 0.76–0.90 × carapace width, whereby the proximal bulb process extends the entire length of the tibia, bulb length 1.09–1.40 × tibia length (Figs. 47–49).

Male (neotype).—Total length 1.93. Carapace pale yellow-brown with fine dusky mottling surrounding margin, and laterally along caput margins; clypeus with dusky mottling distally; sternum dusky; coxae, trochanters, legs, and pedipalpi with dusky mottling, being especially conspicuous at the bases and apices of the segments.

Carapace 0.80 long, 0.65 wide, height at fovea 0.30 × carapace width; clypeus 0.11 high, chelicerae 0.41 long, fang furrow with 7 teeth along a narrow ridge and 3 denticles on retro-margin (Fig. 20). Ocular area 0.20 long, 0.16 wide; diameter PME 0.60 × PLE interdistances. Sternum 0.52 long, 0.47 wide; labium 0.06 long, 0.12 wide; palpal coxae 0.34 long, 0.16 wide.

Spinination: palpus: femur p1-2-1-2-2-2, r2-2-2-2-1 (apical), patella d1, tibia r3, tarsus r1. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.64 + 0.26 + 1.81 + 1.51 + 0.97 = [6.19]; II: 1.23 + 0.26 + 1.21 + 1.05 + 0.75 = [4.50]; III: 1.01 + 0.24 + 0.91 + 0.91 + 0.63 = [3.70]; IV: 1.37 + 0.26 + 1.31 + 1.21 + 0.79 = [4.94]; pedipalpus: 0.86 + 0.71 + 0.99 + 0.55 = [3.11]. Femur I 2.52 × carapace width, palpal femur 1.32 × carapace width.

Palpal bulb (Figs. 47–52) 0.69 long, 0.22 wide; palpal tibia with a retroapical group of stiff setae; proximal bulb process (Figs. 47–49) elongate, reaching to base of tibia, bulb length 0.90 × length tibia; embolus narrowly forked at apex; paraembolar setae circular, reaching to base of fork on embolus (Figs. 51, 52); prolateral apical lobe reduced (Fig. 52).

Abdomen dusky with pale chevron pattern, 1.13 long, 0.76 wide.

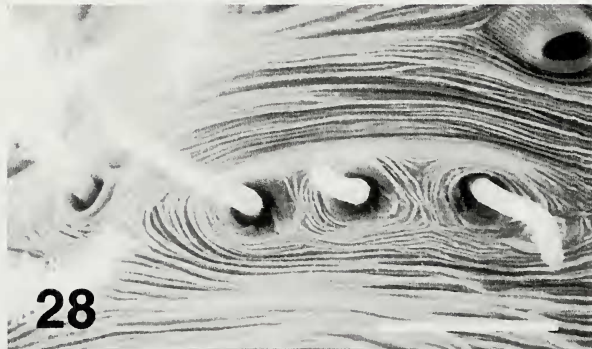
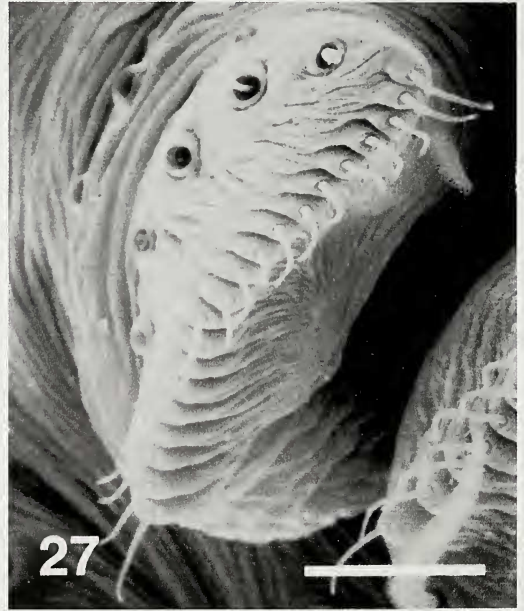
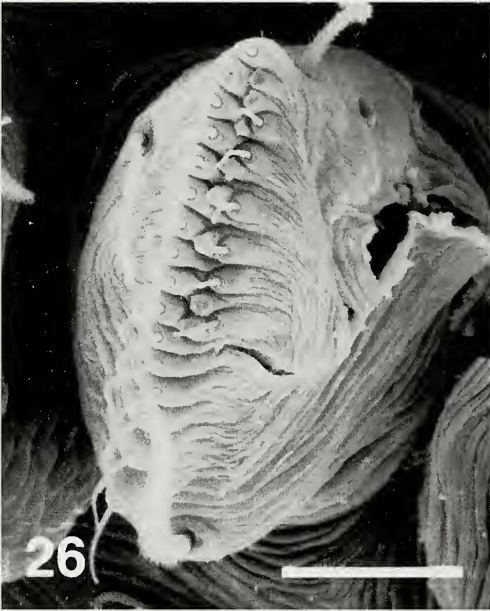
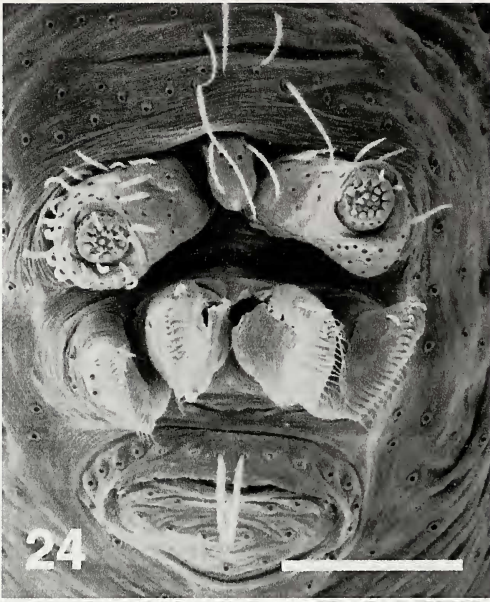
Variation ($n = 4$).—Total length 1.86–1.93; carapace length 1.11–1.23 × carapace width; OAL 1.16–1.35 × OAW, diameter PME 0.55–0.64 × PLE interdistances; length femur I 2.24–2.52 × carapace width, palpal femur 1.25–1.42 × carapace width; palpal bulb length 1.09–1.40 × palpal tibia length; proximal bulb process length 1.0–1.54 × bulb width.

Female (Bell Station).—Total length 2.31. Coloration and markings same as male.

Carapace 0.91 long, 0.72 wide, height at fovea 0.26 × carapace width; clypeus 0.13 high, chelicerae 0.49 long, fang furrow with 7 teeth on a narrow ridge and 5 denticles on retro-margin (Fig. 20). Ocular area 0.20 long, 0.18 wide; diameter PME 0.50 × PLE interdistances. Sternum 0.54 long, 0.54 wide; labium 0.06 long, 0.16 wide; palpal coxae 0.37 long, 0.17 wide.

Spinination: palpus: patella d1, tibia r1-1, tarsus p3-1 (apical), r1 (apical), v1 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.76 + 0.32 + 1.96 + 1.58 + 1.05 = [6.67]; II: 1.41 + 0.28 + 1.43 + 1.13 + 0.79 = [5.04]; III: 1.23 + 0.26 + 1.05 + 1.01 + 0.46 = [4.01]; IV: 1.61 + 0.26 + 1.58 + 1.37 + 0.87 = [5.69]; pedipalpus: 0.61 + 0.19 + 0.42 + 1.01 = [2.23]. Femur I 2.44 × carapace width, palpal femur 0.85 × carapace width.

Abdomen 1.40 long, 1.12 wide. Atrium



0.17 long, 0.22 wide, spermathecae 0.73 long (Fig. 113).

Variation ($n = 2$).—Total length 2.05–2.31; carapace length $1.26\text{--}1.27 \times$ carapace width; OAL $1.11\text{--}1.18 \times$ OAW, diameter PME $0.50\text{--}0.60 \times$ PLE interdistances; length femur I $2.40\text{--}2.44 \times$ carapace width, palpal femur $0.80\text{--}0.85 \times$ carapace width; atrium length $0.77\text{--}0.83 \times$ width, spermathecae $0.61\text{--}0.73 \times$ atrium width (Fig. 114).

Natural history.—The Mt. Diablo specimens were found under moist stones in oak woodland sympatrically with *C. helferi*. This species appears to be restricted to drier habitats, unlike *C. helferi*, which also occurs in redwood forest. Interestingly, a single specimen sifted from redwood duff along the Smith River in northern California (Fig. 120) has a palp that conforms to *C. californica*, however, considering its badly damaged condition (almost nothing of the spider remains except the palp), and unknown collector, it is placed as *C. californica* incertae sedis.

Distribution.—Central and northwestern California (Fig. 120).

Calileptoneta cokendolpheri new species
Figs. 17, 53–58, 117–118, 121

Type material.—Male holotype from pit-fall traps in old growth Douglas Fir at the University of Oregon's H. J. Andrews Experimental Forest, Lane County, Oregon, USA, $44^{\circ}10'N$, $122^{\circ}19'W$, June–July 1987, no collector listed (AMNH). Paratypes: USA: Oregon: same data as holotype (6 ♂, 3 ♀, AMNH).

Etymology.—This species is named in honor of Mr. James Cokendolpher, who contributed additional leptonetid specimens to this study and shared insights into the oftentimes difficult morphology of these spiders.

Diagnosis.—Males are distinguished from all other *Calileptoneta* species by having 2 proapical flanges (Fig. 57), with the basal flange bearing numerous setae, and the apical flange being tightly curled. *Calileptoneta cokendolpheri* may be further distinguished from other *Calileptoneta*, except *C. oasa* and *C.*

ubicki, by lacking a proximal bulb process (Figs. 32–34) and the retroapical pair of twisted palpal tarsal setae; and from *C. oasa* and *C. ubicki* by having a hook-shaped embolus (Fig. 56).

Male (holotype).—Total length 2.33. Specimen pale. Carapace and all leg segments, including pedipalps, dark yellow-brown.

Carapace 1.10 long, 0.91 wide, height at fovea $0.50 \times$ carapace width; clypeus 0.19 high, chelicerae 0.93 long, fang furrow with 9 teeth along a narrow ridge and 4 denticles on retro-margin (Fig. 17). Ocular area 0.15 long, 0.19 wide; diameter PME $0.64 \times$ PLE interdistances. Sternum 0.60 long, 0.65 wide; labium 0.11 long, 0.18 wide; palpal coxae 0.52 long, 0.22 wide.

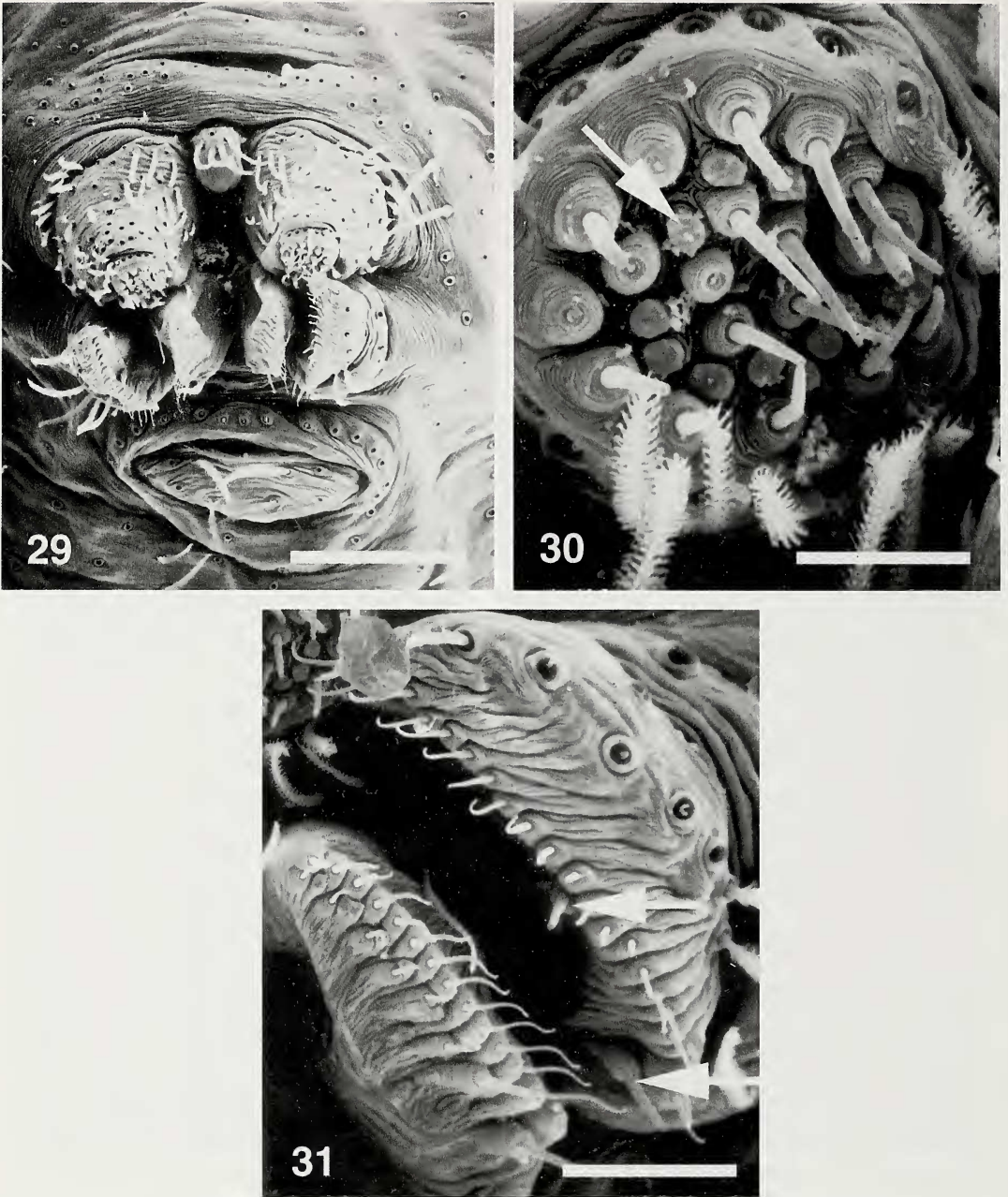
Spination: palpus: patella d1, tibia r1-1-1-1-2 (apical), tarsus r1 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $1.88 + 0.32 + \text{missing} + \text{missing} + \text{missing} = [N/A]$; II: $1.46 + 0.29 + 1.51 + 1.34 + 0.85 = [5.45]$; III: $1.24 + 0.29 + 1.24 + 1.15 + 0.78 = [4.70]$; IV: $1.63 + 0.29 + \text{missing} + \text{missing} + \text{missing} = [N/A]$; pedipalpus: $0.54 + 0.23 + 0.29 + 0.35 = [1.41]$. Femur I $2.07 \times$ carapace width, palpal femur $0.59 \times$ carapace width.

Palpal bulb (Figs. 53–58) 0.42 long, 0.23 wide; palpal tibia with a retroapical group of stiff setae; embolus hook-shaped (Fig. 56); paraembolar setae fan-like, with a single seta extending to base of hook on embolus (Fig. 56); ventral ridge bearing 2 proapical flanges (Fig. 57), with the basal flange bearing numerous setae, and the apical flange being tightly curled; prolateral apical lobe reduced (Fig. 58).

Abdomen dark, without chevron pattern, 1.23 long, 1.07 wide.

Variation ($n = 2$).—Total length 2.14–2.33; carapace length $1.20\text{--}1.22 \times$ carapace width; OAL $0.78\text{--}1.22 \times$ OAW, diameter PME $0.64 \times$ PLE interdistances; length femur I $2.07\text{--}2.15 \times$ carapace width, palpal femur $0.59\text{--}0.76 \times$ carapace width; palpal bulb length $1.30\text{--}1.46 \times$ palpal tibia length.

←
Figures 24–28.—*Calileptoneta helferi* (Gertsch), male from Mt. Diablo, spinning organs. 24. Ventral. 25. Left ALS, arrow to tartipore. 26. Right PMS. 27. Right PLS. 28. Epiandrous spigots. Scale bars: A = 120 μm, B = 13.6 μm, C = 27 μm, D = 25 μm.



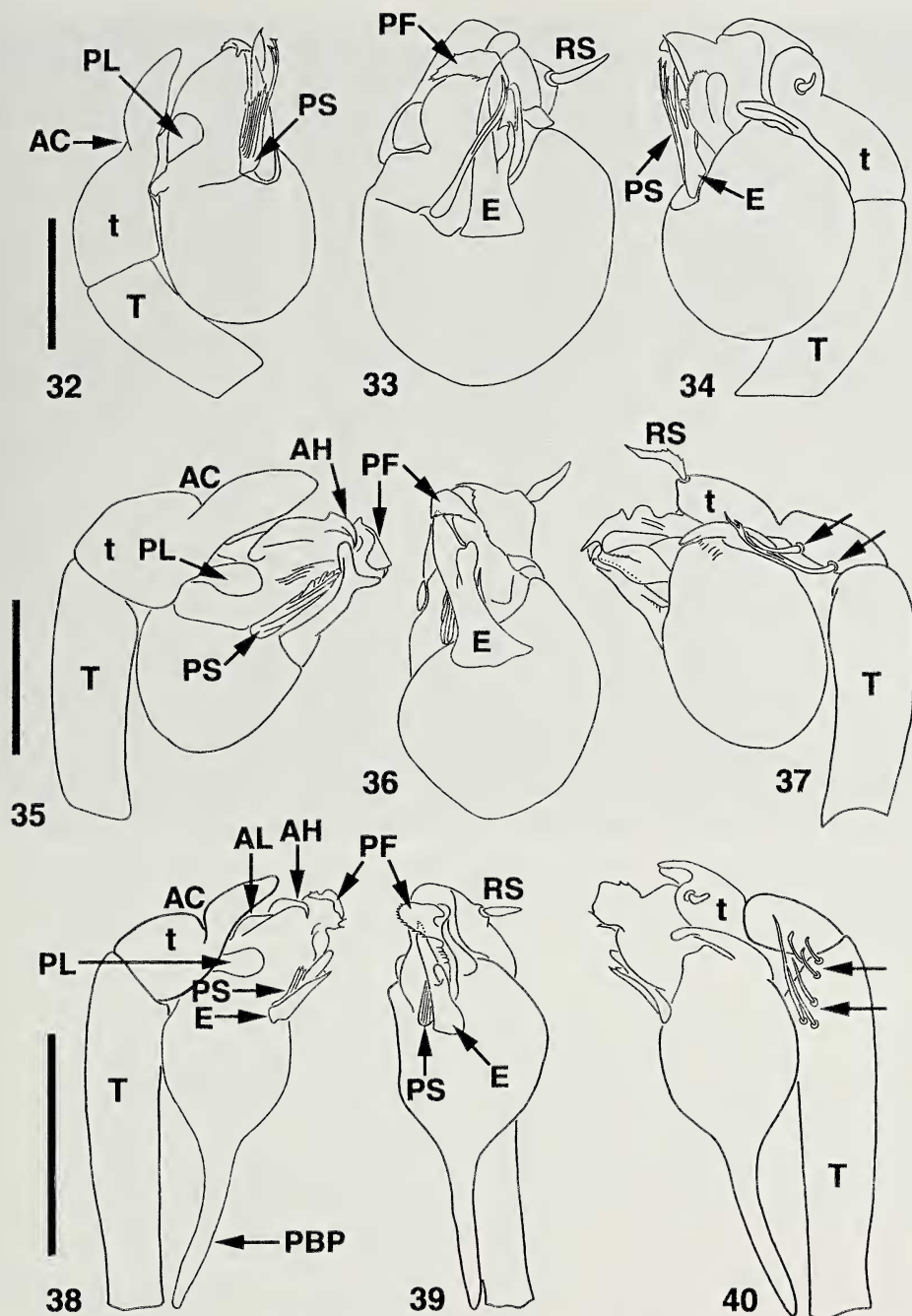
Figures 29–31.—*Calileptoneta* sp., female from Mt. Diablo, spinning organs. 29. Ventral. 30. Left ALS, arrow to tartipore. 31. Left PLS, PMS, arrows to cylindrical gland spigots. Scale bars: A = 120 μ m, B = 13.6 μ m, C = 30 μ m.

Female (paratype).—Total length 2.47. Coloration and markings same as male.

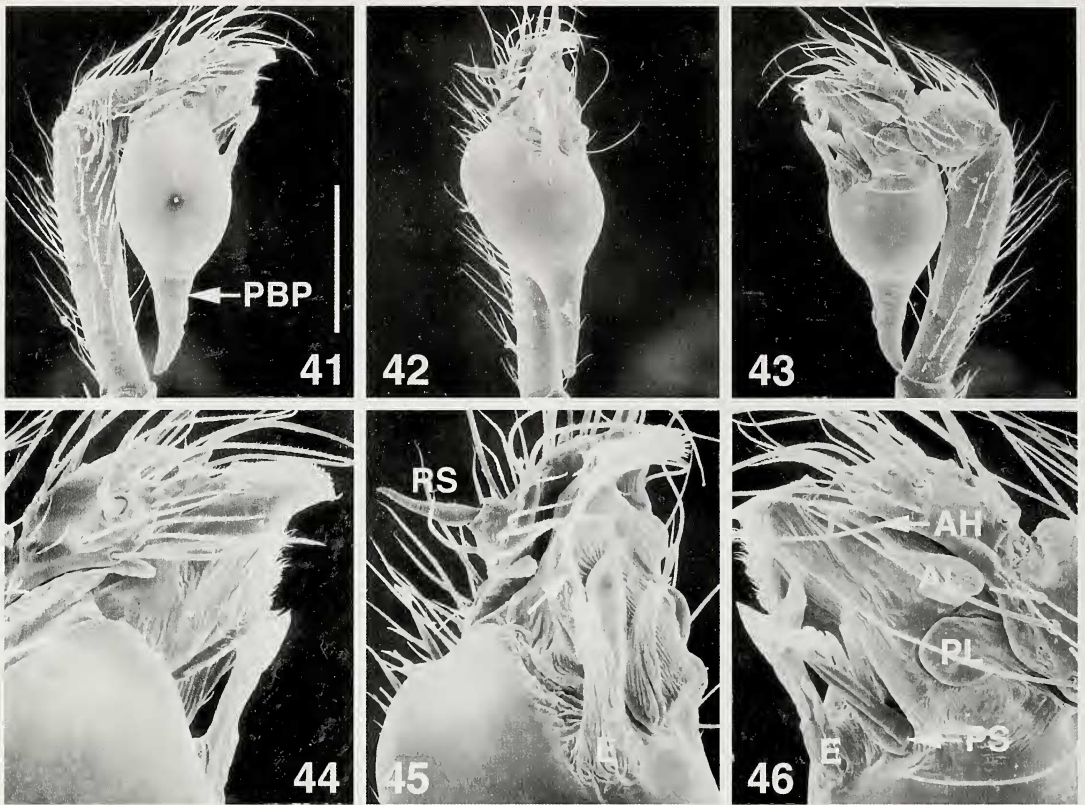
Carapace 1.0 long, 1.0 wide, height at fovea 0.45 \times carapace width; clypeus 0.19 high, chelicerae 0.58 long, fang furrow with 9 teeth along a narrow ridge and 5 denticles on retro-marginal (Fig. 17). Ocular area 0.21 long, 0.19

wide; diameter PME 0.50 \times PLE interdistances. Sternum 0.62 long, 0.65 wide; labium 0.09 long, 0.17 wide; palpal coxae 0.51 long, 0.21 wide.

Spination: palpus: patella d1, tibia v1-2, tarsus p 1(apical), r1 (apical), v 1(apical). Leg measurements (Femur + Patella + Tibia +



Figures 32-40.—*Calileptoneta* sp., male genitalia, left palpus. 32-34. *C. oasa*, Andreas Canyon. 35-37 *C. wapiiti*, Cameron Road, arrows on 37 to retroapical tibial setae. 38-40. *C. californica* Mt. Diablo, arrows on 40 to retroapical setae. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PBP = proximal bulb process, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical tarsal seta, T = tibia, t = tarsus. Scale bars: 32-34 = 0.20 mm, 35-37 = 0.20 mm, 38-40 = 0.40 mm. Illustrations by JL.



Figures 41–46.—*Calileptoneta briggsi* new species, male from Indian Valley Creek Cave, right palpus. 41. retrolateral. 42. ventral. 43. prolateral. 44. retrolateral. 45. ventral. 46. prolateral. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PBP = proximal bulb process, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 41–43 = 250 μm , 44–46 = 100 μm .

Metatarsus + Tarsus = [Total]: I: 1.78 + 0.32 + missing + missing + missing = [N/A]; II: 1.46 + 0.27 + 1.46 + 1.15 + 0.80 = [5.14]; III: 1.27 + 0.24 + missing + missing + missing = [N/A]; IV: 1.54 + 0.24 + 1.32 + 1.29 + missing = [N/A]; pedipalpus: 0.53 + 0.20 + 0.40 + 0.59 = [1.72]. Femur I 1.78 \times carapace width, palpal femur 0.53 \times carapace width.

Abdomen 1.47 long, 0.96 wide. Atrium 0.18 long, 0.25 wide, spermathecae 0.17 long (Fig. 117).

Variation ($n = 2$).—Total length 2.44–2.47; carapace length 1.0–1.27 \times carapace width; OAL 1.0–1.10 \times OAW, diameter PME 0.50 \times PLE interdistances; length femur I 1.54–1.78 \times carapace width, palpal femur 0.51–0.53 \times carapace width; atrium length 0.72–0.81 \times width, spermathecae 0.68–0.69 \times atrium width (Fig. 118).

Natural history.—The entire series of

specimens representing this species were collected in old growth Douglas Fir (*Pseudotsuga menziesii*) using pitfall traps.

Distribution.—Known only from the type locality (Fig. 121).

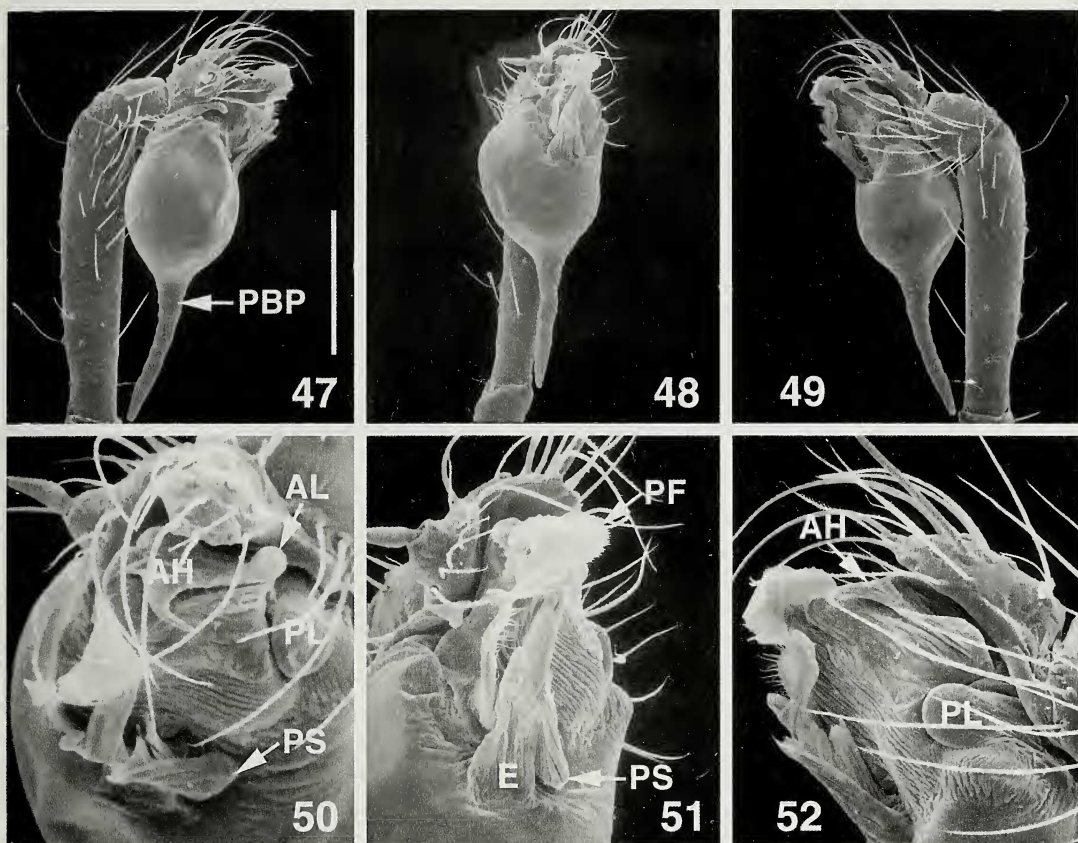
Calileptoneta helferi (Gertsch 1974)

Figs. 6, 7, 21, 24–28, 59–64, 115–116, 120
Leptoneta helferi Gertsch 1974: 192–194; Brignoli 1977: 217.

Calileptoneta helferi (Gertsch): Platnick 1986: 15; Platnick 2002.

Type material.—Male holotype, Carlotta, Humboldt County, California, USA, 40°32'N, 124°03'W, 15 September 1961, W. Ivie, W.J. Gertsch (AMNH, examined).

Other material examined.—USA: *California*: Alameda County: Claremont Ave, 2.2 miles above Berkeley RB-2, 37°52'N, 122°16'W, 10 May 1963, P.R. Craig, D. Dailey (1 ♀, 1 ♂, CASC); Contra Costa County: Mt.



Figures 47–52.—*Calileptoneta californica* (Banks), male from Mt. Diablo, right palpus. 47. retrolateral. 48. ventral. 49. prolateral. 50. ventroapical. 51. ventral. 52. prolateral. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PBP = proximal bulb process, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 47 = 150 μm , 48–49 = 231 μm , 50 = 75 μm , 51–52 = 86 μm .

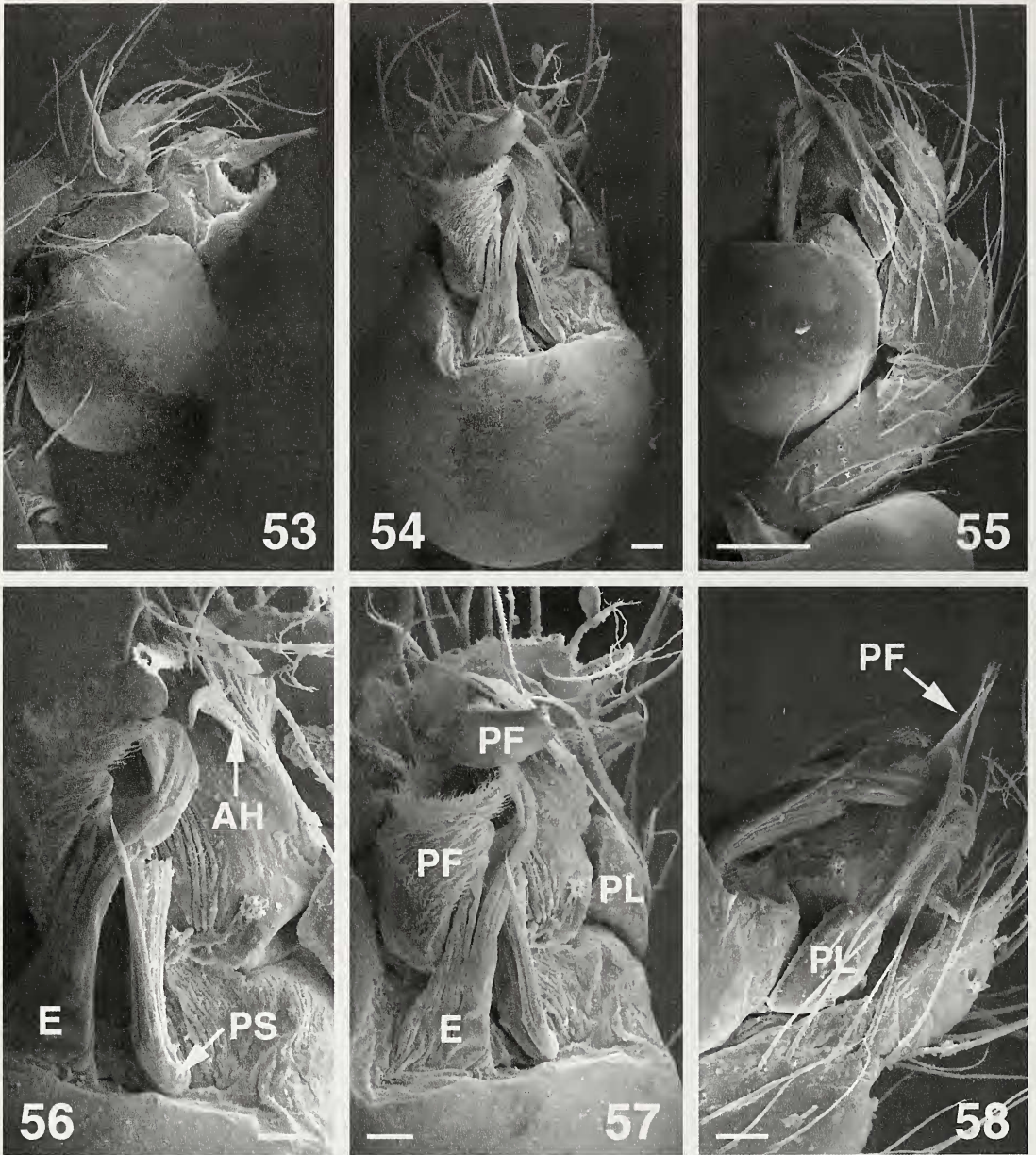
Diablo State Park, BBQ/ Wildcat Group Camp, 37°51'N, 121°55'W, 22 January 2000, J.M. Ledford, under stones (4 δ , 3 f , CASC), 6 February 2000, J.M. & K.E. Ledford, under stones (3 δ , 2 f , CASC); Humboldt County: F.K. Lane State Park., nr. Phillipsville, 40°12'N, 123°47'W, 1 Oct 1959, V. Roth (1 δ , AMNH); Mendocino County: Fault Rock Cave, 2 January 1960, R.E. Graham (#1622, 2 juveniles; #1623, 2 f ; #1625, 2 δ , 2 f , AMNH); 4.2 miles S. Piercy, 39°57'N, 123°47'W, 17 February 1967, V. Roth (1 δ , AMNH); Yolo County: 18.5 km ESE Lower Lake, 38°52'N, 122°23'W, 14. v-7-1993, B.L. Fisher, pitfall traps, non-serpentine, chaparral (1 δ , CASC).

Diagnosis.—Distinguished from other *Calileptoneta*, except *C. briggsi*, *C. californica*, and *C. sylvia*, by males having a proximal bulb

process (Figs. 38–40, 59–61), and a straight retroapical seta (Fig. 39); from *C. briggsi* and *C. sylvia* by having the proximal bulb process (Figs. 59–61) elongate, process length 1.0–2.04 \times bulb width, and having the accessory lobe reduced (Fig. 64); from *C. californica* by having an elongate palpal tibia, length 1.02–1.19 \times carapace width, whereby the proximal bulb process does not reach the base of the tibia, bulb length 0.81–1.04 \times tibia length.

Male (holotype).—Total length 2.29. Coloration and markings same as for *C. californica*, except considerably darker throughout.

Carapace 1.13 long, 0.93 wide, height at fovea 0.39 \times carapace width; clypeus 0.17 high, chelicerae 0.71 long, fang furrow with 5 teeth along a narrow ridge and 5 denticles on retro-margin (Fig. 21). Ocular area 0.30 long, 0.23 wide; diameter PME 0.75 \times PLE interdist-



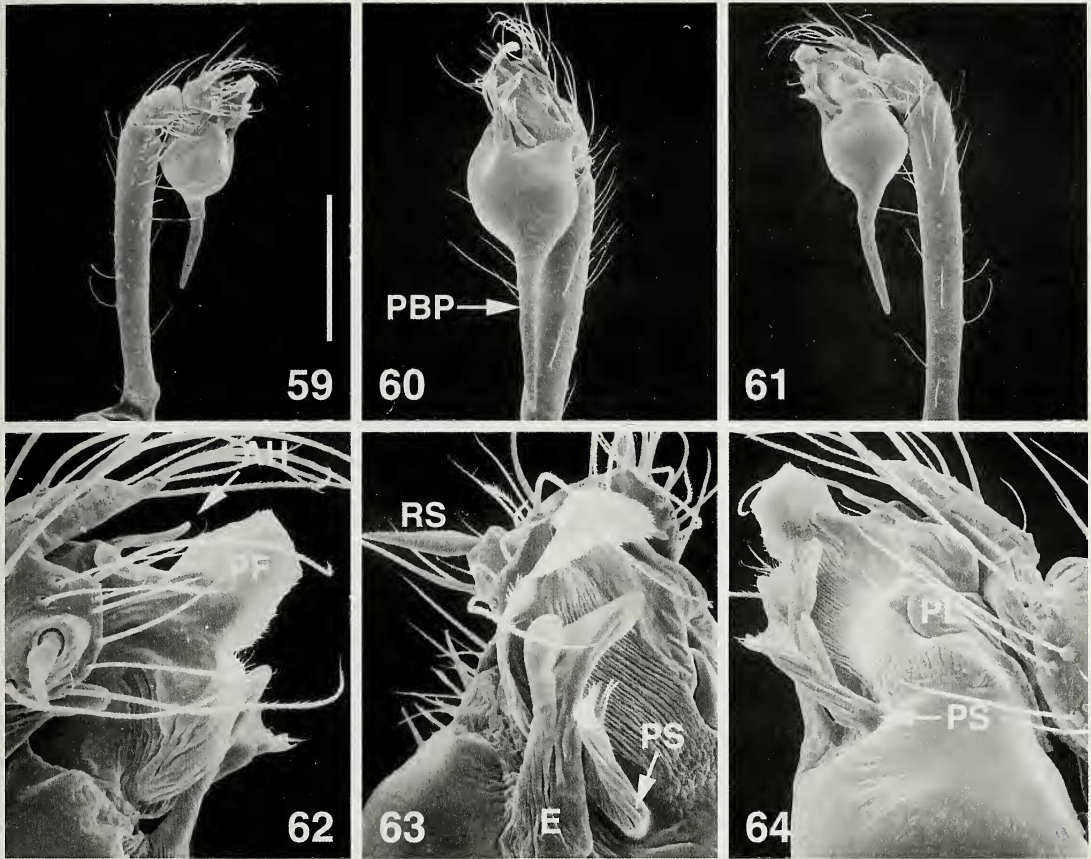
Figures 53–58.—*Calileptoneta cokendolpheri* new species, male from H. J. Andrews, right palpus. 53. retrolateral. 54. ventral. 55. prolateral. 56. retroventral. 57. ventral. 58. proapical. AH = apical hook, E = embolus, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae. Scale bars: 53 = 100 μm, 54 = 20 μm, 55 = 100 μm, 56–58 = 30 μm.

ances. Sternum 0.67 long, 0.70 wide; labium 0.08 long, 0.15 wide; palpal coxae 0.55 long, 0.21 wide.

Spination: palpus: femur p2-1-2-3-3-2-3-3-2-3-3, r1-1-2-1-1-1-2-1-2-2-2-2-1-1, v1 (apical); patella d1, tibia r2, tarsus r1. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.16 + 0.34

+ 1.90 + 1.60 + 1.00 = [7.00]; II: 1.74 + 0.32 + 1.77 + 1.43 + 0.95 = [6.21]; III: 1.47 + 0.30 + 1.31 + 1.25 + 0.83 = [5.16]; IV: 1.86 + 0.30 + 1.86 + 1.60 + 1.00 = [6.62]; pedipalpus: 1.53 + 0.64 + 1.02 + 0.36 = [3.55]. Femur I 2.32 × carapace width, palpal femur 1.65 × carapace width.

Palpal bulb (Figs. 59–64) 1.0 long, 0.25



Figures 59–64.—*Calileptoneta helferi* (Gertsch), male from Mt. Diablo, right palpus. 59. retrolateral. 60. ventral. 61. prolateral. 62. retrolateral. 63. ventral. 64. prolateral. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PBP = proximal bulb process, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 59 = 300 μ m, 60 = 231 μ m, 61 = 300 μ m, 62 = 43 μ m, 63 = 75 μ m, 64 = 86 μ m.

wide; palpal tibia with a retroapical group of stiff setae; proximal bulb process elongate, not reaching to base of tibia, bulb length $0.98 \times$ length tibia; embolus narrowly forked at apex; paraembolar setae circular, reaching to base of fork on embolus (Figs. 63, 64); prolateral apical lobe reduced (Fig. 64).

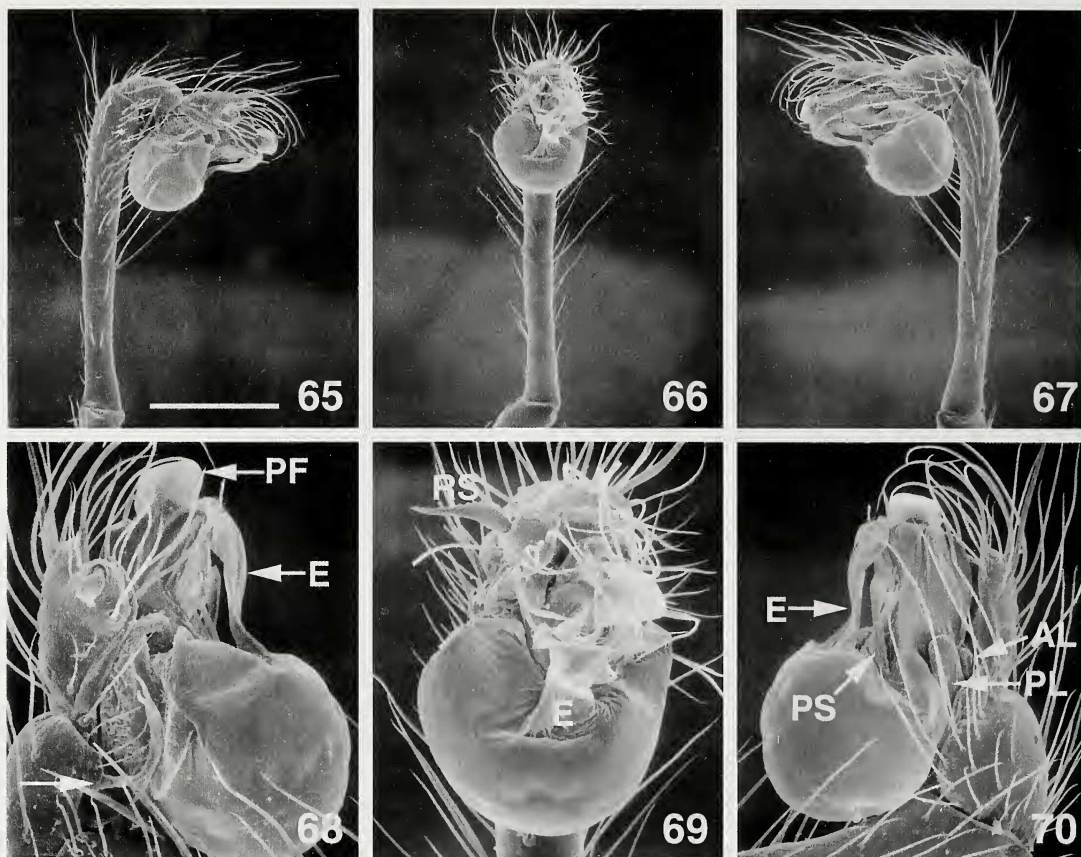
Abdomen dusky with pale chevron pattern (Fig. 6), 1.16 long, 1.05 wide.

Variation ($n = 9$).—Total length 2.04–2.34; carapace length 1.15 – $1.29 \times$ carapace width; OAL 1.14 – $1.45 \times$ OAW, diameter PME 0.50 – $0.73 \times$ PLE interdistances; length femur I 2.15 – $2.66 \times$ carapace width, palpal femur 1.34 – $1.98 \times$ carapace width; palpal bulb length 0.81 – $1.10 \times$ palpal tibia length; proximal bulb process length 1.40 – $2.04 \times$ bulb width.

Female (Claremont Ave.).—Total length 2.25. Coloration and markings same as male.

Carapace 0.92 long, 0.73 wide, height at fovea $0.26 \times$ carapace width; clypeus 0.12 high, chelicerae 0.45 long, fang furrow with 7 teeth on a narrow ridge and 3 denticles on retro-margin (Fig. 21). Ocular area 0.25 long, 0.22 wide; diameter PME $0.50 \times$ PLE interdistances. Sternum 0.57 long, 0.51 wide; labium 0.08 long, 0.15 wide; palpal coxae 0.36 long, 0.18 wide.

Spination: palpus: patella d1, tarsus p2-1-1, r1-1, v1-2 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $1.47 + 0.30 + 1.62 + 0.95 + 0.87 = [5.21]$; II: $1.23 + 0.28 + 1.11 + 0.97 + 0.71 = [4.30]$; III: $1.03 + 0.28 + 0.95 + 0.85 + 0.61 = [3.72]$; IV: $1.37 + 0.26 + 1.25 +$



Figures 65–70.—*Calileptoneta noyoana* (Gertsch), male from Fort Bragg, right palpus. Arrow on 68 to retroapical setae. 65. retrolateral. 66. ventral. 67. prolateral. 68. retrolateral. 69. ventroapical. 70. retrolateral. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 65–67 = 200 μm , 68–70 = 75 μm .

1.09 + 0.75 = [4.72]; pedipalpus: 0.54 + 0.17 + 0.39 + 0.49 = [1.59]. Femur I 2.01 \times carapace width, palpal femur 0.74 \times carapace width.

Abdomen 1.33 long, 1.06 wide. Atrium 0.14 long, 0.19 wide, spermathecae 0.13 long (Fig. 115).

Variation ($n = 3$).—Total length 2.24–2.40; carapace length 1.21–1.26 \times carapace width; OAL 1.14–1.19 \times OAW, diameter PME 0.50–0.64 \times PLE interdistances; length femur I 2.01–2.13 \times carapace width, palpal femur 0.74–0.80 \times carapace width; atrium length 0.74–0.81 \times width, spermathecae 0.68–1.18 \times atrium width.

Natural history.—The Mt. Diablo specimens were found under moist stones in oak woodland sympatrically with *C. californica*.

Distribution.—Northwestern California (Fig. 120).

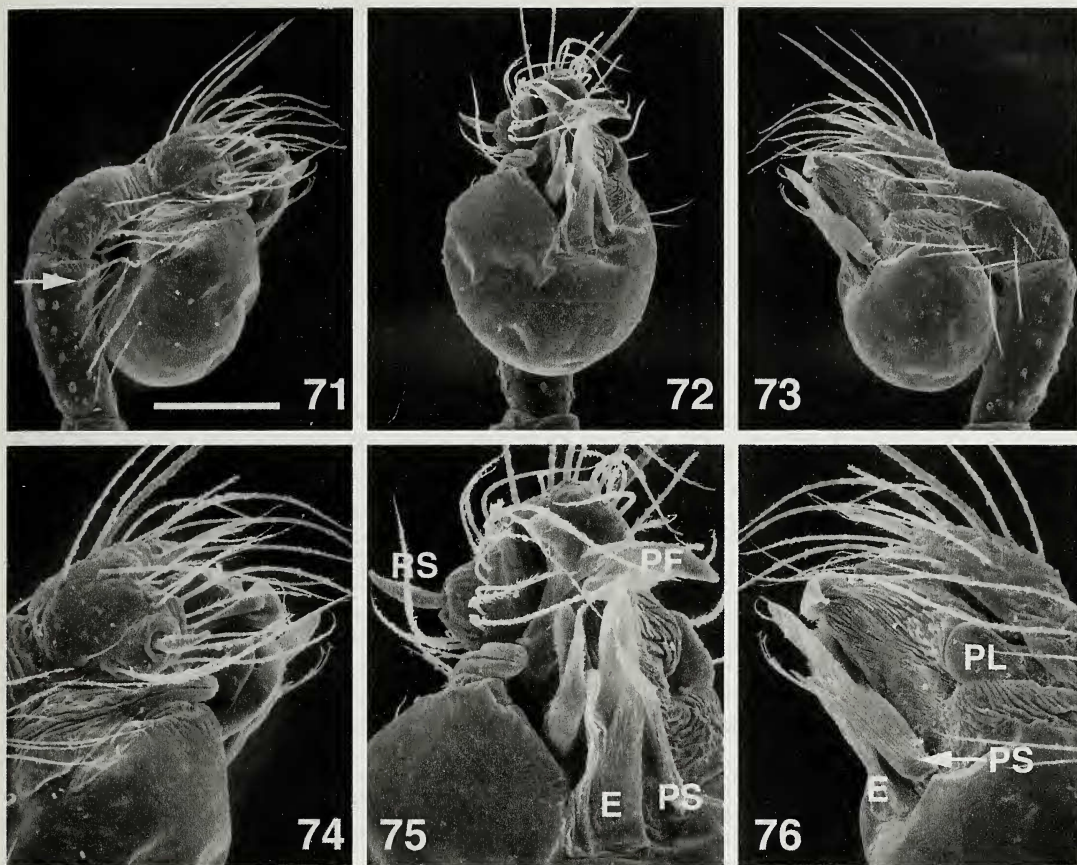
Calileptoneta noyoana (Gertsch 1974)
Figs. 4–5, 19, 65–70, 96, 100–101,
106–108, 120

Leptoneta noyoana Gertsch 1974: 196–197; Brignoli 1977: 217.

Calileptoneta noyoana (Gertsch): Platnick 1986: 15; Platnick 2002.

Type material.—Male holotype from 12–15 miles E. Noyo, Mendocino County, California, USA, 39°25'N, 123°48'W, 13 September 1961, W.J. Gertsch, W. Ivie (AMNH, examined)

Material examined.—USA: *California*: Humboldt County: Humboldt Redwoods State Park, Founder's Grove, 40°21'N, 123°55'W,



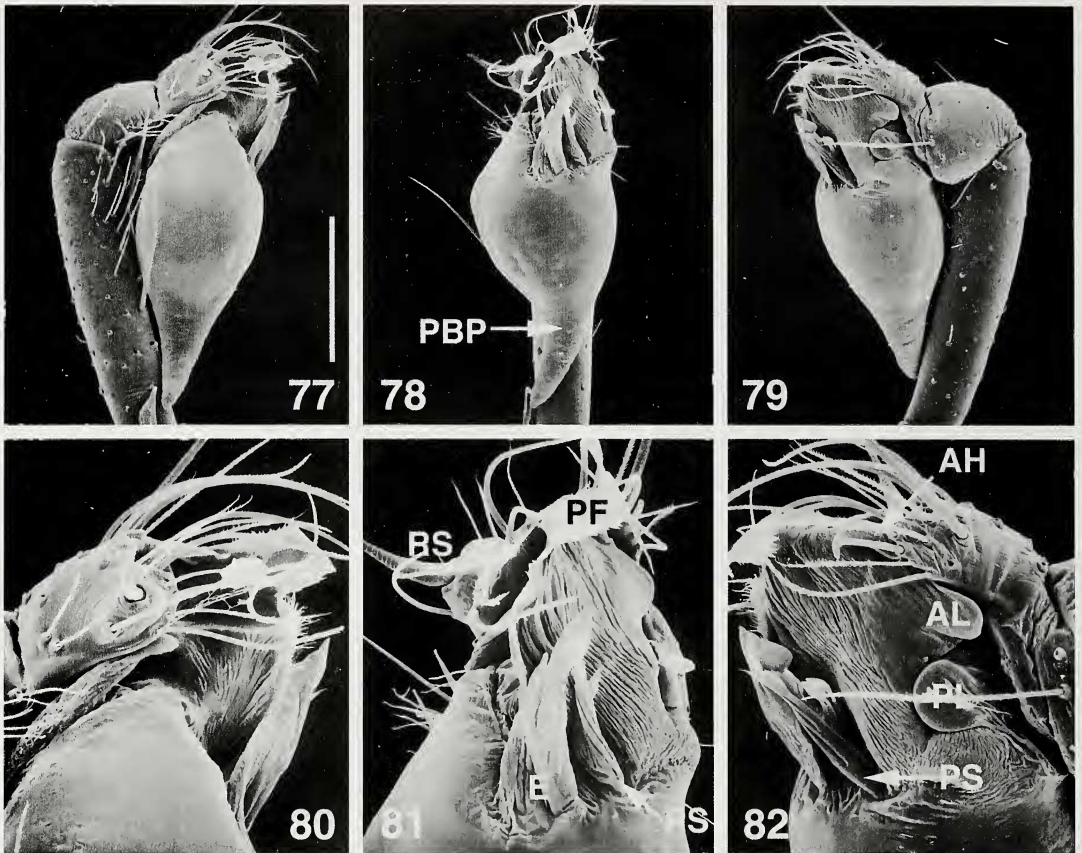
Figures 71–76.—*Calileptoneta oasa* (Gertsch), male from Andreas Canyon, right palpus. 71. retrolateral. 72. ventral. 73. prolateral. 74. retroapical. 75. ventroapical. 76. proapical. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 71–73 = 136 μ m, 74–76 = 75 μ m.

28 October 1990, in redwood duff, D. Ubick, W. Rauscher (2 ♀, 2 juveniles including penultimate male, DU); Humboldt Redwoods State Park, Tall Tree, 40°19'N, 123°59'W, 250 ft. elevation, 11 September 1992, D. Ubick, J. Boutin (3 ♀, 2 juveniles including penultimate male, DU); Mendocino County: Jackson State Forest, Camp Dunlap Area, 39°21'N, 123°33'W, 16 September 1990, in redwood duff, D. Ubick (1 ♂, DU); 0.5 miles W. Camp Dunlap, 39°21'N, 123°33'W, 400 ft. elevation, 16 September 1990, in redwood duff, D. Ubick (1 ♀, DU); Dunlap Camp, 39°21'N, 123°33'W, 400 ft. elevation, 7 September 1992, in redwood duff, D. Ubick, J. Boutin (1 ♀, DU); 3.0 miles S. Rockport, 39°44'N, 123°48'W, 300 ft. elevation, 19 September 1990, in redwood duff, D. Ubick (1 ♂, DU); 2.0 miles S. Usal Campground, 39°50'N,

123°50'W, 1000 ft. elevation, 19 September 1990, in redwood duff, D. Ubick (1 ♀, DU); 1 miles NE Usal Road along HWY 1, 200 ft. elevation, 39°50'N, 123°50'W, 20 September 1990, D. Ubick (1 ♂, DU); Big River Camp, ~2 miles W. James Creek, 39°20'N, 123°30'W, 5 May 1991, in redwood duff, D. Ubick (2 ♂, 2 ♀, 3 juveniles, DU); Noyo River, 14.5 air miles E. Fort Bragg, 39°25.5'N, 123°32'W, 25–26.v.1996, C.E. Griswold (2 ♂, 1 ♀, juvenile, CASC).

Diagnosis.—Distinguished from other *Calileptoneta*, except *C. wapiti*, by having males with retrolateral twisted tarsal setae on the palpus (Figs. 37, 68) and an enlarged distal cheliceral tooth (Fig. 19); from *C. wapiti* by having an elongate palpal femur, 2.24–2.78 × carapace width (Fig. 5).

Male (holotype).—Total length 2.26. Spec-



Figures 77–82.—*Calileptoneta sylvia* (Chamberlin & Ivie), male from Samwell Cave, right palpus. 77. retrolateral. 78. ventral. 79. prolateral. 80. retroapical. 81. ventroapical. 82. retroapical. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PBP = proximal bulb process, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 77–79 = 200 μm , 80–82 = 86 μm .

imen faded. Carapace yellow-brown with dusky mottling along margin; clypeus yellow-brown; sternum yellow-brown; coxae, trochanters, legs, and pedipalpi with dusky mottling, being especially conspicuous at the bases and apices of the segments.

Carapace 1.06 long, 0.87 wide, height at fovea 0.46 \times carapace width; clypeus 0.15 high, chelicerae 0.74 long, fang furrow with 8 teeth along a narrow ridge and 5 denticles on retro-marginal (Fig. 19). Ocular area 0.30 long, 0.22 wide; diameter PME 0.70 \times PLE interdistances. Sternum 0.63 long, 0.58 wide; labium 0.10 long, 0.18 wide; palpal coxae 0.50 long, 0.24 wide.

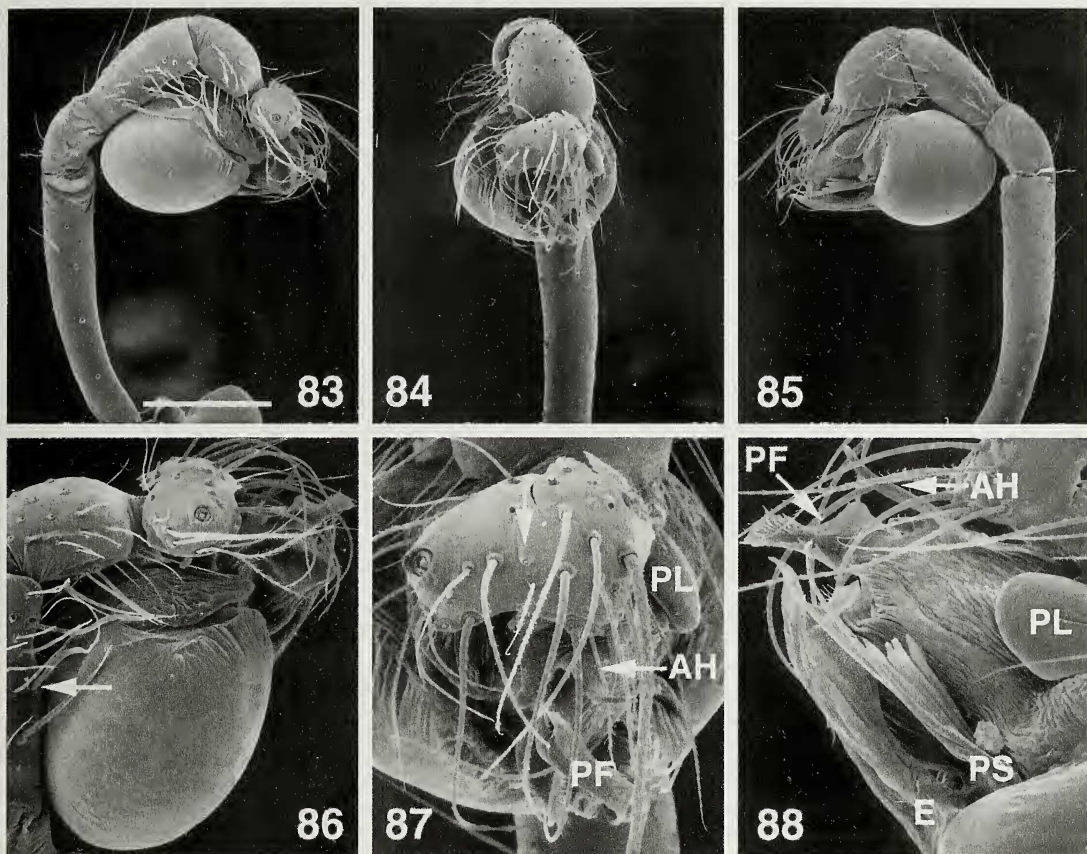
Spination: palpus: patella d1, tibia r3-1-1, tarsus p1(apical), r1-1-1 (apical). Leg measurements (Femur + Patella + Tibia + Meta-tarsus + Tarsus = [Total]): I: 2.04 + 0.34 +

2.17 + 1.70 + 1.02 = [7.27]; II: 1.56 + 0.32 + 1.60 + 1.34 + 0.93 = [5.74]; III: 1.29 + 0.24 + 1.24 + 1.15 + 0.73 = [4.65]; IV: 1.73 + 0.29 + 1.70 + 1.44 + 0.90 = [6.06]; pedipalpus: 2.42 + 1.31 + 1.21 + 0.46 = [5.40]. Femur I 2.34 \times carapace width, palpal femur 2.78 \times carapace width.

Palpal bulb (Figs. 65–70) 0.49 long, 0.27 wide; retroapical seta proximally broad and tapering to a point distally; embolus broadly forked at apex; paraembolar setae fan-like, with 3 truncate setae at the base, and a single seta forming a broad flange distally; accessory lobe reduced (Fig. 70).

Abdomen dusky with pale chevron pattern (Fig. 4), 1.20 long, 0.96 wide.

Variation ($n = 4$).—Total length 2.17–2.50; carapace length 1.21–1.59 \times carapace width; OAL 1.20–1.37 \times OAW, diameter PME 0.60–



Figures 83–88.—*Calileptoneta ubicki* new species, male from Arroyo Seco Canyon, right palpus. 83. retrolateral. 84. ventral. 85. prolateral. 86. retrolateral. 87. ventroapical. 88. proapical. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 83 = 250 μm , 84 = 231 μm , 85 = 270 μm , 86 = 136 μm , 87 = 86 μm , 88 = 75 μm .

0.70 \times PLE interdistances; length femur I 2.32–2.35 \times carapace width, palpal femur 2.24–2.78 \times carapace width; bulb length 0.40–0.45 \times palpal tibia length; abdomen pale to dusky, with or without chevron pattern.

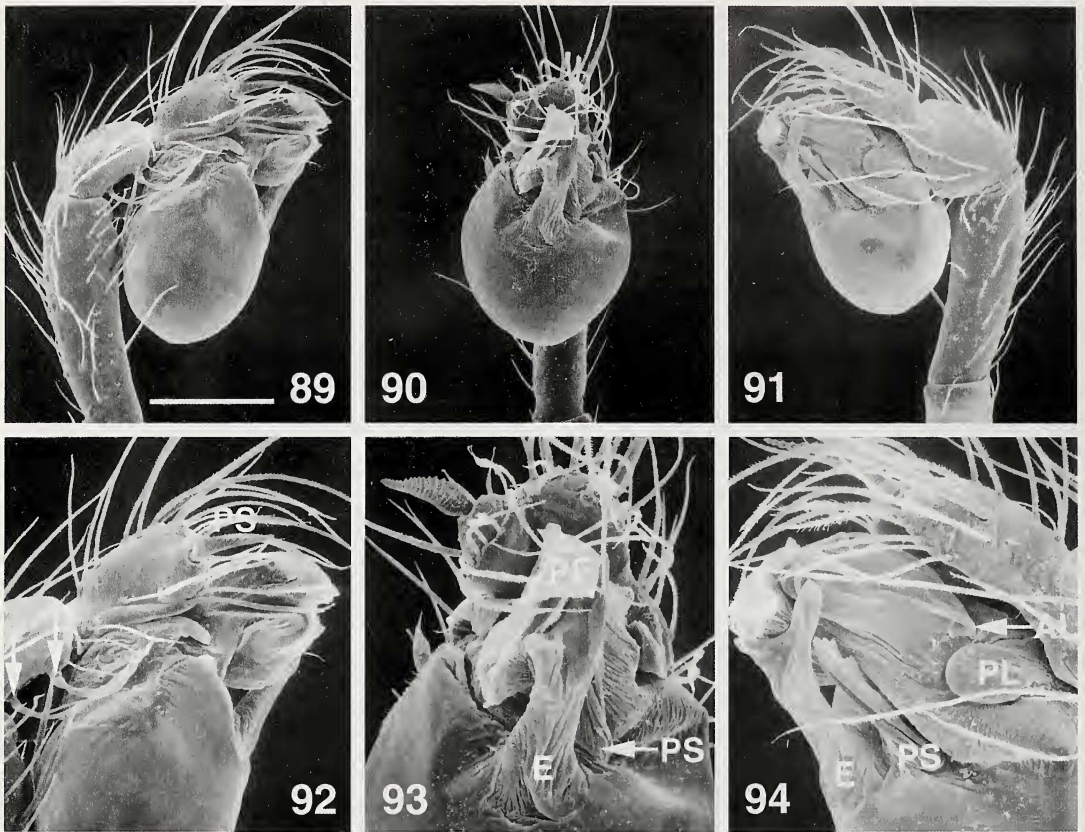
Female (Fort Bragg).—Total length 2.24. Coloration and markings same as male. Carapace 0.69 long, 0.59 wide, height at fovea 0.50 \times carapace width; clypeus 0.11 high, chelicerae 0.33 long, fang furrow with 8 teeth along a narrow ridge and 3 denticles on retro-margin (Fig. 19). Ocular area 0.24 long, 0.19 wide; diameter PME 0.50 \times PLE interdistances. Sternum 0.54 long, 0.56 wide; labium 0.09 long, 0.16 wide; palpal coxae 0.36 long, 0.20 wide.

Spination: palpus: patella d1, tarsus p2-1-1 (apical), r1-1 (apical). Leg Measurements (Femur + Patella + Tibia + Metatarsus + Tarsus

= [Total]): I: 1.41 + 0.29 + 1.54 + 1.15 + 0.85 = [5.24]; II: 1.17 + 0.29 + 1.20 + 0.93 + 0.73 = [4.32]; III: 1.04 + 0.24 + 0.90 + 0.83 + 0.61 = [4.19]; IV: 1.37 + 0.24 + 1.61 + 1.36 + 0.88 = [5.46]; pedipalpus: 0.58 + 0.23 + 0.45 + 0.50 = [1.76]. Femur I 1.83 \times carapace width, palpal femur 0.75 \times carapace width.

Abdomen 1.31 long, 0.96 wide. Atrium 0.19 long, 0.24 wide, spermathecae 0.17 long (Figs. 106–108).

Variation ($n = 4$).—Total length 2.03–2.53; carapace length 1.0–1.23 \times carapace width; OAL 1.0–1.35 \times OAW, diameter PME 0.6–0.7 \times PLE interdistances; length femur I 1.62–2.08 \times carapace width, palpal femur 0.75–0.83 \times carapace width; atrium length 0.77–0.79 \times width, spermathecae 0.65–0.71 \times atrium width.



Figures 89–94.—*Calileptoneta wapiti* (Gertsch), male from Cameron Road, right palpus. 89. retrolateral. 90. ventral. 91. prolateral. 92. retroapical. 93. ventroapical. 94. proapical. AC = apical constriction, AH = apical hook, AL = apical lobe, E = embolus, PF = proapical flange, PL = prolateral lobe, PS = paraembolar setae, RS = retroapical setae. Scale bars: 89–91 = 176 μm , 92–94 = 86 μm .

Natural history.—This spider is most commonly found among the dense leaf litter in redwood and Douglas fir forests although they may also be found under moist rotting logs. Individuals in captivity constructed small sheet webs like those of other *Calileptoneta* species. The extremely long palp of the male suggests a mating behavior potentially unique among *Calileptoneta* species.

Distribution.—Restricted to redwood (*Sequoia sempervirens*) and mixed evergreen forests (Douglas fir-redwood) on the Pacific northwest coast of California (Fig. 120).

Calileptoneta oasa (Gertsch 1974)

Figs. 15, 32–34, 71–76, 102–103, 119

Leptoneta oasa Gertsch 1974: 197; Brignoli 1977: 217.

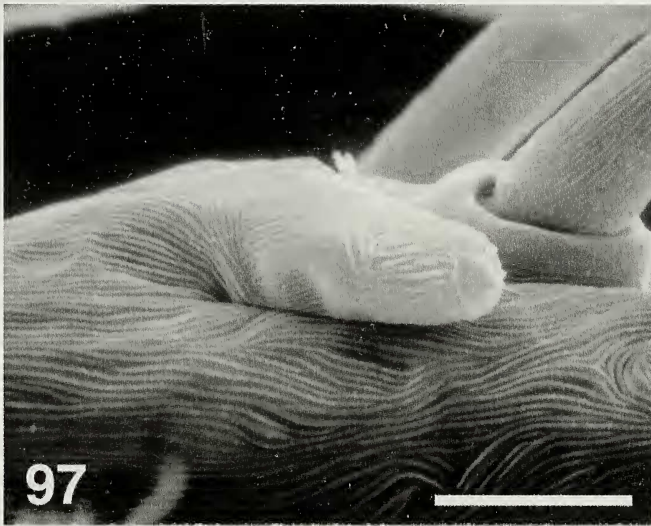
Calileptoneta oasa (Gertsch): Platnick 1986: 15; Platnick 2002.

Type material.—Male holotype from An-

dreas Canyon, off Palm Canyon, near Palm Springs, Riverside County, California, USA, 33°49'N, 116°32'W, 26 March 1960, W.J. Gertsch (AMNH, examined). Paratype: USA: California: 1 ♀, same data as holotype (AMNH, examined).

Other material examined.—USA: California: Riverside County: Andreas Canyon, near Palm Springs, 33°49'N, 116°32'W, 3 March 1956, V. Roth (1 ♂, 1 ♀, 1 juvenile, MCZ unique # 35493).

Diagnosis.—Distinguished from other *Calileptoneta*, except *C. ubicki*, by having females with a bifid atrium (Fig. 102) and males without a proximal bulb process (Figs. 32–34) or retrolateral twisted tarsal setae on the palpus (Fig. 37); from *C. ubicki* by the following combination of characters: lacking a retrodistal cheliceral apophysis (Fig. 16), having a hook-shaped retroapical tibial seta on the pal-



Figures 95-97.—*Calileptoneta* sp., tarsal organs, right palp, dorsoapical. 95. *C. ubicki* new species, from Arroyo Seco Canyon. 96. *C. noyoana* (Gertsch), from Fort Bragg. 97. *C. sylva* (Chamberlin & Ivie), from Samwell Cave. Scale bars: 95 = 7.5 μm , 96 = 10 μm , 97 = 8.6 μm .

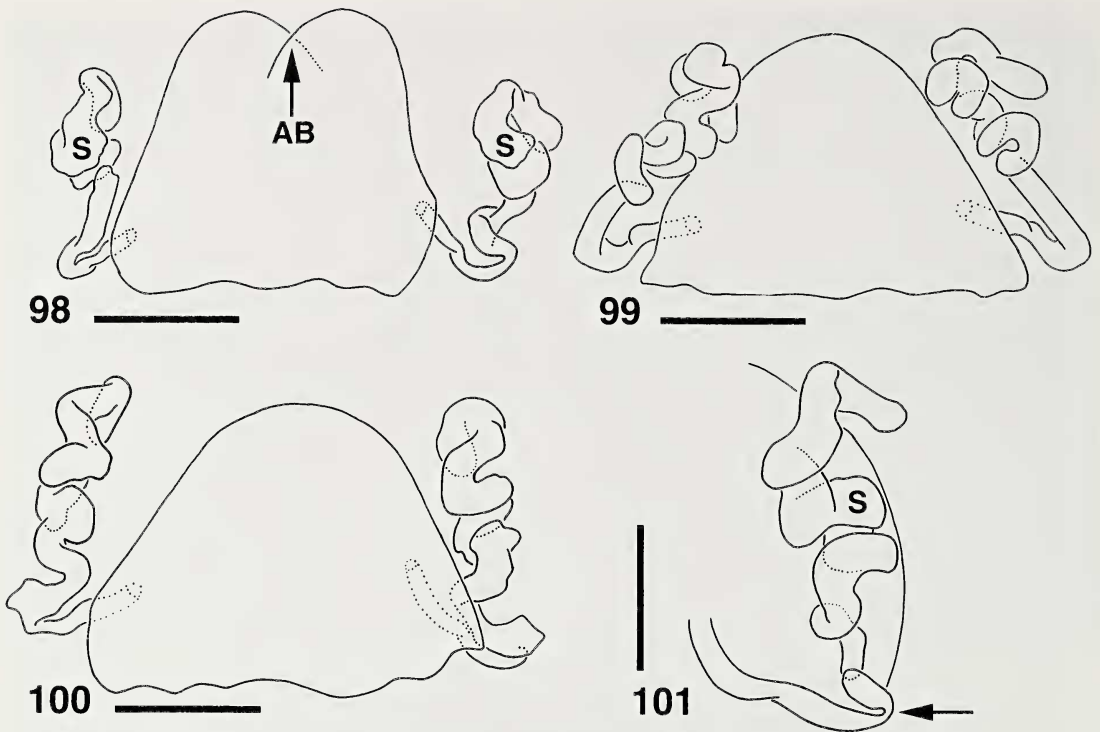
pus (Fig. 71), and having the proapical flange straight anteriorly (Fig. 76).

Male (holotype).—Total length 1.70. Specimen faded. Carapace yellow-brown with dusky mottling surrounding margin, and laterally along caput margins; clypeus with dusky mottling distally; sternum dusky; coxae, trochanters, leg segments, and palpi yellow-brown.

Carapace 0.75 long, 0.62 wide, height at fo-

vea $0.54 \times$ carapace width; clypeus 0.12 high, chelicerae 0.45 long, fang furrow with 5 teeth along a narrow ridge and 1 denticles on retro-margin (Fig. 15). Ocular area 0.21 long, 0.15 wide; diameter PME $0.75 \times$ PLE interdistances. Sternum 0.48 long, 0.45 wide; labium 0.08 long, 0.15 wide; palpal coxae 0.30 long, 0.15 wide.

Spinination: palpus: patella d1; tibia r1-1. Leg measurements (Femur + Patella + Tibia +



Figures 98–101.—*Calileptoneta* sp., female genitalia, ventral. 98. *C. ubicki* new species, from Arroyo Seco Canyon. 99. *C. californica* (Banks), from Bell Station. 100. *C. noyoana* (Gertsch), from Fort Bragg. 101. *C. noyoana* (Gertsch), from Fort Bragg, left lateral, arrow to sharp bend in spermathecae. AB = apical bifurcation. S = spermathecae. Scale bars: 98 = 0.08 mm, 99 = 0.10 mm, 100 = 0.12 mm, 101 = 0.08 mm. Illustrations by JL.

Metatarsus + Tarsus = [Total]: I: $1.83 + 0.24 + 1.85 + 1.65 + 0.98 = [6.55]$; II: $1.37 + 0.24 + 1.51 + \text{missing} + \text{missing} = [\text{N/A}]$; III: $1.12 + 0.20 + 1.05 + 1.0 + 0.61 = [3.98]$; IV: $1.46 + 0.20 + 1.07 + 1.0 + 0.61 = [4.34]$; pedipalpus: $0.42 + 0.15 + 0.20 + 0.29 = [1.06]$. Femur I $2.95 \times$ carapace width, palpal femur $0.68 \times$ carapace width.

Palpal bulb (Figs. 71–76) 0.36 long, 0.20 wide; palpal tibia with a retroapical hook-shaped seta; embolus tapering to a sharp point (Fig. 75); paraembolar setae fan-like with 3 sagitate setae extending to apex of embolus (Fig. 76); accessory lobe reduced.

Abdomen dusky with pale chevron pattern, 0.95 long, 0.77 wide.

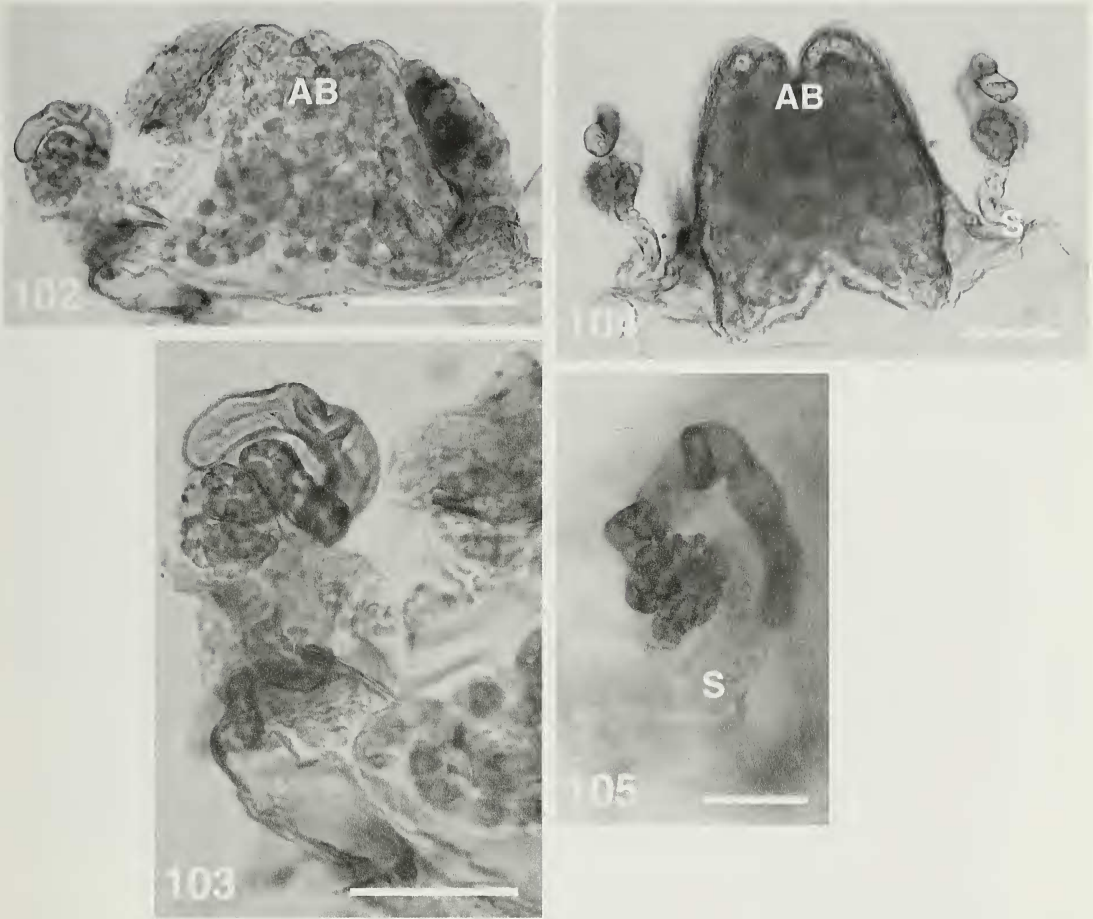
Variation ($n = 2$).—Total length 1.70–1.71; carapace length $1.21\text{--}1.23 \times$ carapace width; OAL $1.08\text{--}1.40 \times$ OAW, diameter PME $0.66\text{--}0.77 \times$ PLE interdistances; length femur I $2.79\text{--}3.0 \times$ carapace width, palpal femur $0.68\text{--}0.69 \times$ carapace width; bulb length $1.80\text{--}2.20 \times$ palpal tibia length.

Female (paratype).—Total length 1.28. Specimen faded. Coloration and markings same as male.

Carapace 0.69 long, 0.59 wide, height at fovea $0.50 \times$ carapace width; clypeus 0.11 high, chelicerae 0.33 long, fang furrow with 6 teeth on a narrow ridge and 4 denticles on retromargin (Fig. 15). Ocular area 0.18 long, 0.14 wide; diameter PME $0.62 \times$ PLE interdistances. Sternum 0.45 long, 0.42 wide; labium 0.05 long, 0.15 wide; palpal coxae 0.25 long, 0.13 wide.

Spination: palpus: patella d1, tarsus p1, r1-1, v2-1. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $1.29 + 0.22 + 1.39 + 1.12 + 0.78 = [4.8]$; II: $1.0 + 0.20 + 1.0 + 0.83 + 0.61 = [3.64]$; III: $0.89 + 0.20 + 0.78 + 0.71 + 0.51 = [3.09]$; IV: $1.17 + 0.20 + 1.02 + 0.90 + 0.49 = [3.78]$; pedipalpus: $0.41 + 0.12 + 0.22 + 0.38 = [1.13]$. Femur I $2.19 \times$ carapace width, palpal femur $0.69 \times$ carapace width.

Abdomen 1.19 long, 0.95 wide. Atrium



Figures 102–105.—*Calileptoneta* sp., female genitalia, ventral (102, 104) and left lateral (103, 105). 102–103. *C. oasa* (Gertsch), from Andreas Canyon. 104–105. *C. ubicki* new species, from Arroyo Seco Canyon. AB = apical bifurcation, S = spermatheca. Scale bars: 102 = 0.10 mm, 103 = 0.05 mm, 104 = 0.10 mm, 105 = 0.08 mm.

0.18 long, 0.21 wide, spermathecae 0.12 long (Figs. 102–103).

Variation ($n = 2$).—Total length 1.28–1.72; carapace length 1.17 – $1.22 \times$ carapace width; OAL 1.24 – $1.29 \times$ OAW, diameter PME 0.62 – $0.70 \times$ PLE interdistances; length femur I 2.19 – $2.56 \times$ carapace width, palpal femur 0.69 – $0.72 \times$ carapace width.

Natural history.—Unknown.

Distribution.—Known only from the type locality (Fig. 119).

Calileptoneta sylvia (Chamberlin & Ivie 1942)

Figs. 23, 77–82, 97, 109–110, 121

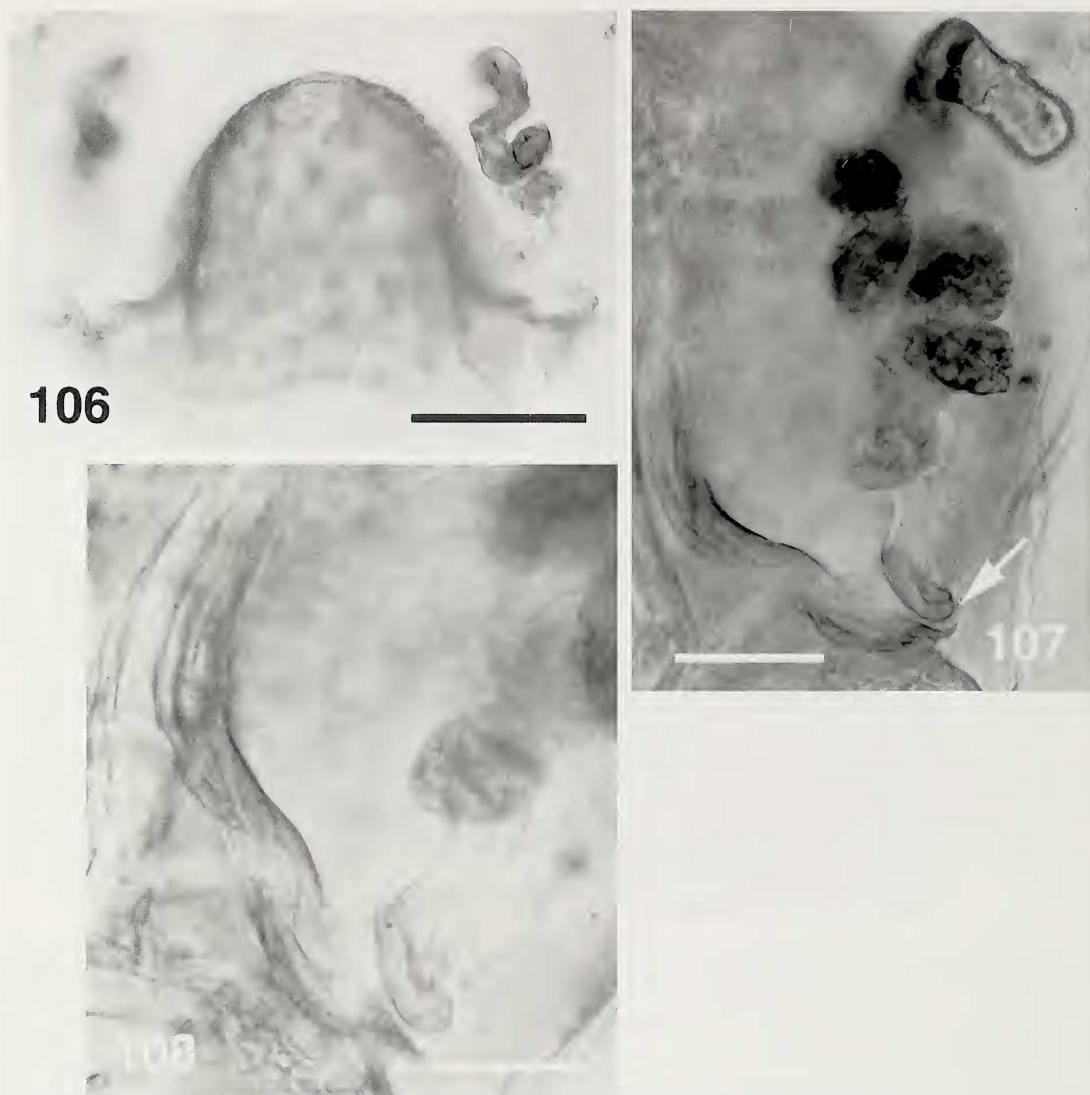
Leptoneta sylvia Chamberlin & Ivie 1942: 9–10.

Leptoneta californica (Chamberlin & Ivie); Gertsch 1974: 191 (misidentification, not *L. californica* Banks 1904).

Calileptoneta californica (Chamberlin & Ivie) (part): Platnick 1986: 14; Platnick 2002.

Type material.—Female holotype, 19 miles N. Wolf Creek, Jackson County, Oregon, USA, $42^{\circ}42'N$, $122^{\circ}57'W$, 6 April 1937, J.C. Chamberlin (holotype female, AMNH).

Other material examined.—USA: *California*: Shasta County: Samwell Cave, $40^{\circ}55'N$, $122^{\circ}14'W$, 14 April 2000, J.M. Ledford, at entrance under limestone (1 ♂, 2 juveniles, CASC); *Oregon*: Jackson County: Ashland watershed, T39S, R1E, SEC 34, PFT #46, 20 July 1998, R.W. Peck et al. (1 ♂, OSU); Jenny Creek LSR, Medford district, $41^{\circ}58'N$, $122^{\circ}24'W$, BLM, LS, Oldgrowth, T39S, R03E, SEC 35, PFT 31–40, 21–23 June



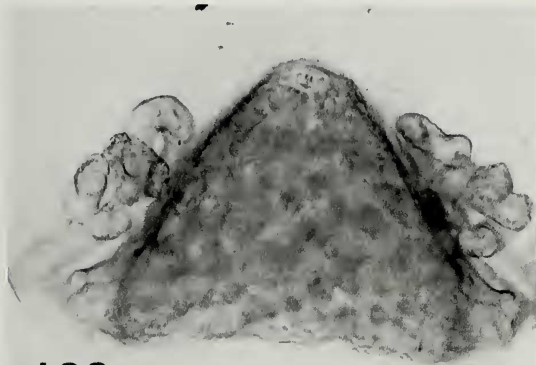
Figures 106–108.—*Calileptoneta noyoana* (Gertsch), female genitalia, ventral (106) and left lateral (107, 108). Arrow in 107 to sharp bend in spermatheca. Scale bars: 106 = 0.10 mm, 107 = 0.05 mm, 108 = 0.025 mm.

1999, B. Peck (1 ♂, OSU); Jenny Creek LSR, Medford district, 41°58'N, 122°24'W, BLM, LS, Oldgrowth, T39S, R03E, SEC 35, traps 21–3–0, 16–18 August 1999, B. Peck (1 ♀, OSU).

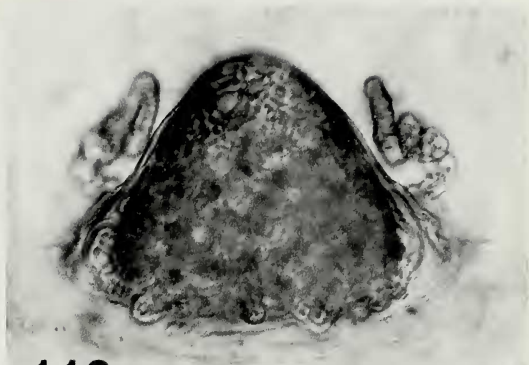
Diagnosis.—Distinguished from other *Calileptoneta*, except *C. briggsi*, *C. californica*, and *C. helferi*, by males having a proximal bulb process (Figs. 38–40, 77–79) and a straight retroapical seta (Figs. 39, 78); from *C. californica* and *C. helferi* by having the proximal bulb process (Figs. 77–79) short, process length 0.55–0.86 × bulb width, and

having the prolateral apical lobe large (Figs. 46, 82); from *C. briggsi* by being darkly pigmented and having a straight, distally narrowed embolus with a slight prolateral bend (Fig. 81).

Male (Samwell Cave).—Total length 2.17. Carapace yellow-brown with fine dusky mottling surrounding margin, and laterally along caput margins; clypeus with dusky mottling distally; sternum dusky; coxae, trochanters, legs, and pedipalpi with dusky mottling, being especially conspicuous at the bases and apices of the segments.



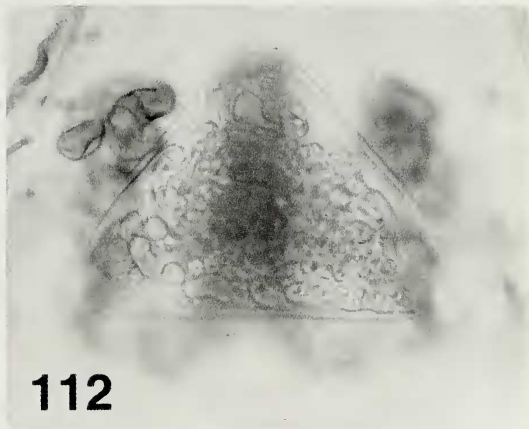
109



110



111



112

Figures 109–112.—*Calileptoneta* sp., female genitalia, ventral. 109. *C. sylvia* (Chamberlin & Ivie) holotype. 110. *C. sylvia* (Chamberlin & Ivie), from Jenny Creek. 111–112. *C. briggsi* new species from Indian Valley Creek Cave. Scale bars: 109–110 = 0.10 mm, 111–112 = 0.12 mm.

Carapace 1.0 long, 0.90 wide, height at fovea $0.24 \times$ carapace width; clypeus 0.14 high, chelicerae 0.57 long, fang furrow with 9 teeth along a narrow ridge and 4 denticles on retro-margin (Fig. 23). Ocular area 0.26 long, 0.22 wide; diameter PME $0.64 \times$ PLE interdistances. Sternum 0.65 long, 0.62 wide; labium 0.10 long, 0.19 wide; palpal coxae 0.47 long, 0.21 wide.

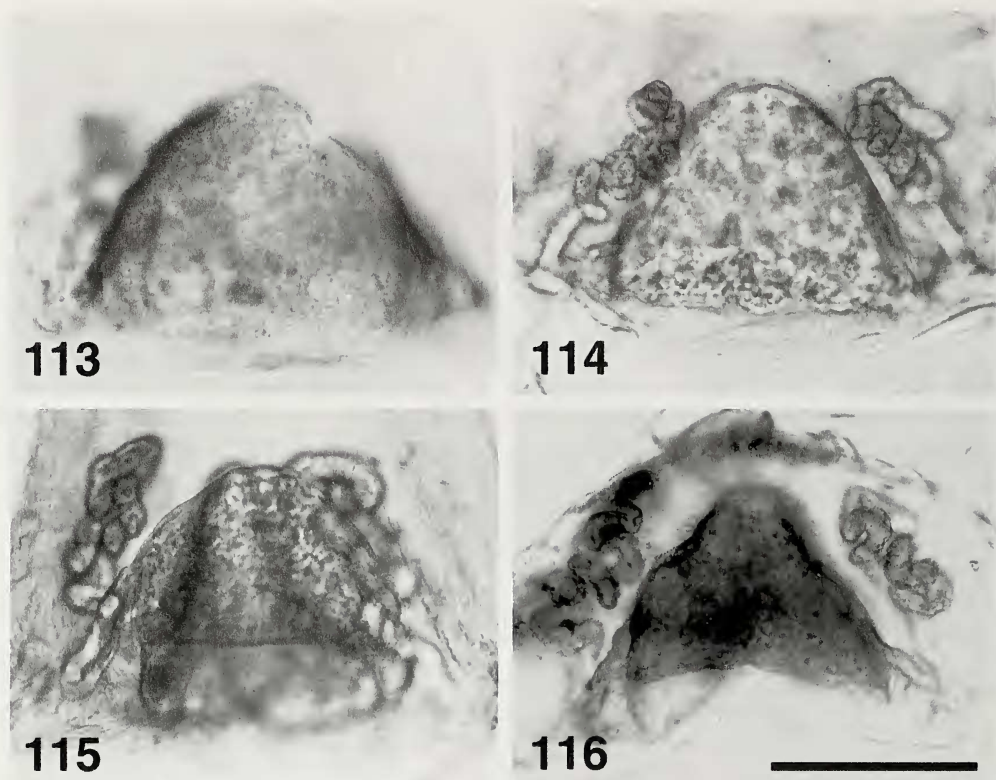
Spination: palpus: femur p1-3-2-1-2-1-2-2-2, r5-3-2-2 (apical), v1 (apical); patella d1; tibia r1-2-1-1-3; tarsus r1 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $2.36 + 0.34 + 2.72 + 2.18 + 1.15 = [8.75]$; II: $1.74 + 0.32 + 1.74 + 1.47 + 0.88 = [6.15]$; III: $1.43 + 0.28 + 1.29 + 1.21 + 0.73 = [4.94]$; IV: $1.81 + 0.30 + 1.77 + 1.61 + 0.95 = [6.44]$; pedipalpus: $0.95 + 0.36 + 0.49 + 0.63 = [2.43]$. Femur I $2.62 \times$ carapace width, palpal femur $0.1.05 \times$ carapace width.

Palpal bulb (Figs. 77–82) 0.61 long, 0.22 wide; palpal tibia with a retroapical group of stiff setae; proximal bulb process short, reaching to base of tibia, bulb length $1.24 \times$ length tibia; embolus distally narrowed with a slight prolateral bend; paraembolar setae circular, distally broad, reaching to apex of embolus (Fig. 82).

Abdomen dusky with pale chevron pattern, 1.17 long, 0.89 wide.

Variation ($n = 2$).—Total length 2.04–2.17; OAL 1.18 – $1.23 \times$ OAW, diameter PME 0.50 – $0.64 \times$ PLE interdistances; length femur I 2.16 – $2.72 \times$ carapace width, palpal femur 0.96 – $1.05 \times$ carapace width; palpal bulb length 1.20 – $1.24 \times$ palpal tibia length; proximal bulb process length 0.55 – $0.86 \times$ bulb width.

Female (holotype).—Total length 2.69. Specimen faded. Carapace yellow-brown with dusky mottling surrounding margin, and lat-



Figures 113–116.—*Calileptoneta* sp., female genitalia, ventral. 113. *C. californica* (Banks) from Oakville. 114. *C. californica* (Banks) from Bell Station. 115. *C. helferi* (Gertsch) from Fault Rock Cave. 116. *C. helferi* (Gertsch) from Claremont Avenue. Scale bar = 0.10 mm.

erally along caput margins; clypeus with dusky mottling distally; sternum yellow-brown; coxae, trochanters, leg segments, and palpi yellow-brown.

Carapace 1.05 long, 0.92 wide, height at fovea $0.26 \times$ carapace width; clypeus 0.10 high, chelicerae 0.61 long, fang furrow with 9 teeth on a narrow ridge and 2 denticles on retro-margin (Fig. 23). Ocular area 0.28 long, 0.23 wide; diameter PME $0.54 \times$ PLE interdistances. Sternum 0.65 long, 0.59 wide; labium 0.10 long, 0.16 wide; palpal coxae 0.45 long, 0.23 wide.

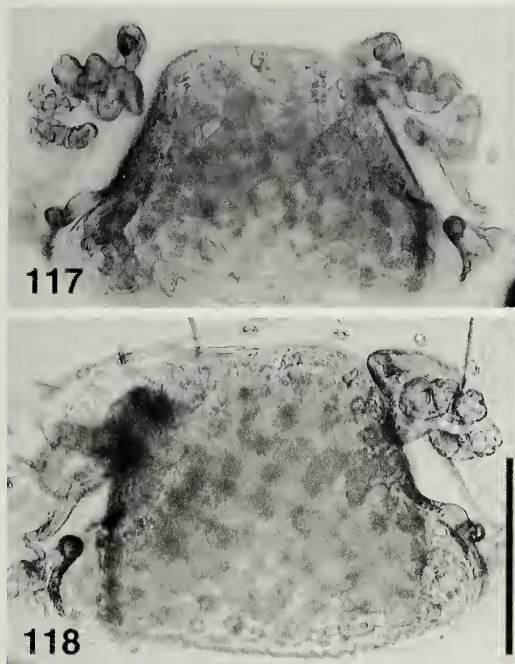
Spination: palpus: patella d1, tarsus p2-1-1, r1-1, v1-2 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $1.77 + 0.34 + 2.0 + 1.61 + 1.07 = [6.79]$; II: $1.41 + 0.34 + \text{missing} + \text{missing} + \text{missing} = [N/A]$; III: $1.29 + 0.28 + 1.21 + 1.11 + 0.75 = [4.64]$; IV: $1.70 + 0.32 + 1.70 + 1.47 + 0.91 = [6.10]$; pedipalpus: $0.66 + 0.23 + 0.47 + 0.59 = [1.95]$. Femur I 1.92

\times carapace width, palpal femur $0.72 \times$ carapace width.

Abdomen 1.64 long, 1.53 wide. Atrium 0.19 long, 0.20 wide, spermathecae 0.16 long (Fig. 109).

Variation ($n = 2$).—The only known female besides the holotype (Jenny Creek) is badly damaged and missing most appendages. Atrium 0.19 long, 0.20 wide, spermathecae 0.14 long (Fig. 110).

Remarks.—Gertsch (1974) synonymized *L. sylva* with *L. californica* based on the similarity in abdominal pattern and female genitalia between the type of *L. sylva* and a topotypic female of *L. californica* (Mt. Diablo). The type of *L. californica* was lost at the California Academy of Sciences during the 1906 earthquake and fire. Since the abdominal patterns within *Calileptoneta* species are variable, and the female genitalia for species outside the *oasa* group do not allow specific diagnosis, I consider the synonymy of these



Figures 117–118.—*Calileptoneta cokendolphi* new species, female genitalia, ventral. 117–118. Females from H. J. Andrews, showing intraspecific variation. Scale bar = 0.12 mm.

species unjustified. Additionally, males belonging to the *californica* group, clearly different from the species treated in this paper, have been recently discovered near the type locality of *L. sylva*. Instead of assigning a new name to this species, they are placed with *L. sylva*.

Natural history.—The male from Samwell Cave, Shasta County was collected under limestone at the cave entrance that remains cool and moist throughout the year. No specimens have ever been taken inside the cave despite extensive arachnid surveys.

Distribution.—Southern Oregon to north-central California (Fig. 121).

Calileptoneta ubicki new species

Figs. 1, 2, 3, 16, 83–88, 95, 98, 104, 105, 119

Type material.—Male holotype from Arroyo Seco Canyon Campground, SW of Lakes, Monterey County, California, USA, 36°14'N, 121°28'W, 22 January 2001, J.M. Ledford, P. Marek (CASC).

Other material examined.—USA: *California*: Monterey County: Arroyo Seco Campground, SW of Lakes, 36°14'N, 121°28'W,



Figure 119.—Distribution map for *Calileptoneta oasa* (Gertsch), and *Calileptoneta ubicki* new species ● = *C. oasa*, ■ = *C. ubicki*.

900 ft. elevation, under granite, 6 May 1995, D. Ubick, W. Savary (1 ♂, DU), 22 January 2001, J.M. Ledford, P. Marek (2 ♀, CASC).

Etymology.—This species is named in honor of Mr. Darrell Ubick, collector of this and many other leptonetid spiders throughout California.

Diagnosis.—Distinguished from other *Calileptoneta*, except *C. oasa*, by having females with a bifid atrium (Figs. 98, 104), and males without a proximal bulb process (Figs. 32–34, 83–88) or retrolateral twisted tarsal setae on the palpus (Fig. 37); from *C. oasa* by males having a retrodistal cheliceral apophysis (Fig. 16), a whip-shaped retroapical tibial seta on the palpus (Fig. 86), and having a sinuate proapical flange (Fig. 88).

Male (holotype).—Total length 2.31. Carapace yellow-brown with a fine dusky band surrounding margin, and laterally along caput margins; clypeus with faint dusky mottling distally; sternum dusky; coxae, trochanters, legs, and pedipalpi with dusky mottling, being especially conspicuous at the bases and apices of the segments.

Carapace 1.08 long, 0.91 wide, height at fovea 0.44 × carapace width; clypeus 0.19 high, chelicerae 0.93 long, fang furrow with 7 teeth along a narrow ridge and 5 denticles and a large distal tooth on retromargin (Fig. 16). Oc-

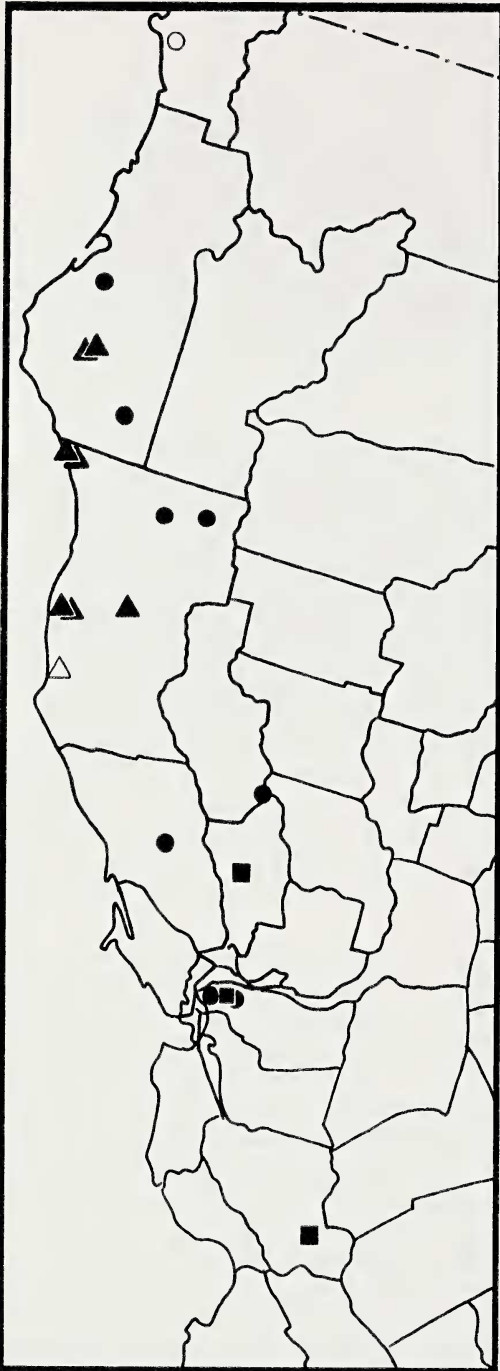


Figure 120.—Distribution map for *Calileptoneta* sp. ■ = *C. californica* (Banks), ● = *C. helferi* (Gertsch), ○ = *C. californica incertae sedis*, ▲ = *C. noyoana* (Gertsch), △ = *C. wapiti* (Gertsch).

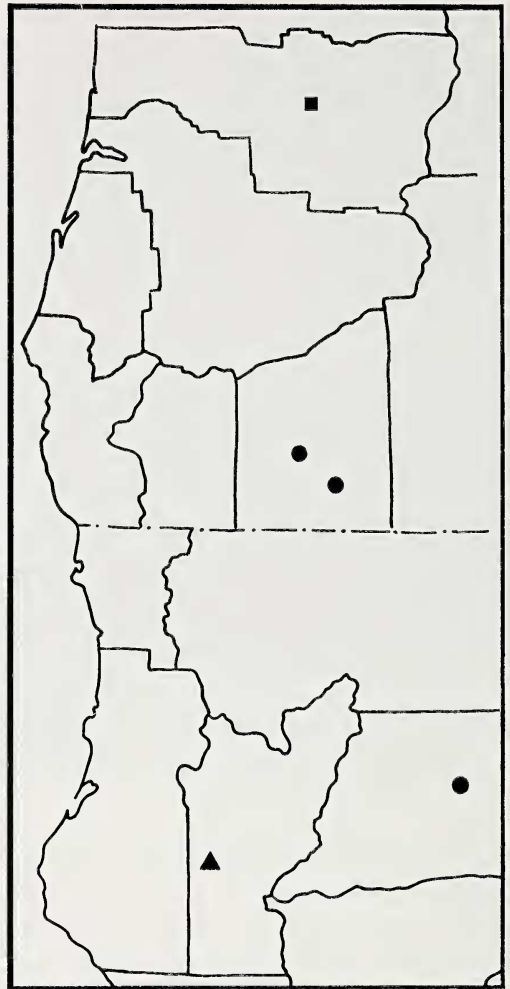


Figure 121.—Distribution map for *Calileptoneta briggsi* new species, *Calileptoneta cokendolpheri* new species, and *Calileptoneta sylvia* (Chamberlin & Ivie). ▲ = *Calileptoneta briggsi*, ■ = *C. cokendolpheri*, ● = *C. sylvia*.

ular area 0.23 long, 0.22 wide; diameter PME 0.53 × PLE interdistances (Fig. 2). Sternum 0.67 long, 0.63 wide; labium 0.12 long, 0.19 wide; palpal coxae 0.53 long, 0.17 wide.

Spination: palpus: patella d1, tibia r1-1-1. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.41 + 0.34 + 2.80 + 2.43 + 1.29 = [9.27]; II: 1.80 + 0.29 + 1.95 + 1.70 + 0.98 = [6.72]; III: 1.54 + 0.24 + 1.44 + 1.41 + 0.85 = [5.48]; IV: 2.0 + 0.32 + 1.90 + 1.80 + 1.0 = [7.02]; pedipalpus: 0.71 + 0.21 + 0.38 + 0.36 = [1.66]. Femur I 1.09 × carapace width, palpal femur 0.78 × carapace width.

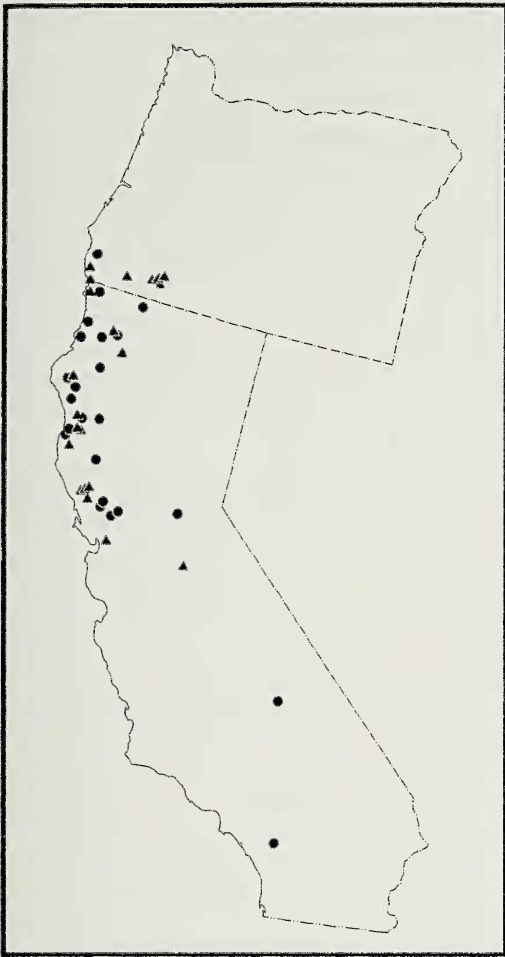


Figure 122.—Distribution map for undiagnosable females and juvenile *Calileptoneta* sp. ▲ = undiagnosable females, ● = juveniles.

Palpal bulb (Figs. 83–88) 0.42 long, 0.25 wide; palpal tibia with a retroapical whip-shaped seta; embolus tapering to a sharp point; paraembolar setae fan-like with 3 clavate setae (Fig. 88); proapical flange sinuate (Fig. 88); accessory lobe reduced.

Abdomen pale with a dusky chevron pattern (Fig. 2), 1.23 long, 1.07 wide.

Variation ($n = 2$).—Total length 2.30–2.31; carapace length 1.17–1.19 \times carapace width; OAL 1.04–1.05 \times OAW, diameter PME 0.50–0.53 \times PLE interdistances; length femur I 2.65–2.67 \times carapace width, palpal femur 0.75–0.78 \times carapace width; bulb length 1.30–1.56 \times palpal tibia length.

Female (paratype).—Total length 2.31. Coloration and markings same as male.

Carapace 0.80 long, 0.68 wide, height at fovea 0.41 \times carapace width; clypeus 0.12 high, chelicerae 0.31 long, fang furrow with 8 teeth along retromargin and 4 denticles (Fig. 16). Ocular area 0.18 long, 0.19 wide; diameter PME 0.50 \times PLE interdistances. Sternum 0.50 long, 0.47 wide; labium 0.06 long, 0.14 wide; palpal coxae 0.28 long, 0.13 wide.

Spination: palpus: patella d1, tarsus p1-1-1, r1-1-1-v2 (apical). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.60 + 0.27 + 1.70 + 1.46 + 0.98 = [6.01]; II: 1.24 + 0.22 + 1.21 + 1.07 + 0.78 = [4.52]; III: 1.07 + 0.22 + 0.93 + 0.90 + 0.83 = [3.95]; IV: 1.4 + 0.22 + 1.24 + 1.15 + 0.80 = [4.81]; pedipalpus: 0.42 + 0.14 + 0.29 + 0.50 = [1.35]. Femur I 2.4 \times carapace width, palpal femur 0.62 \times carapace width.

Abdomen 1.51 long, 1.13 wide. Atrium 0.19 long, 0.17 wide, spermathecae 0.14 long (Fig. 104).

Variation ($n = 2$).—Total length 2.31–2.40; carapace length 1.22–1.18 \times carapace width; OAL 0.95–1.0 \times OAW, diameter PME 0.50 \times PLE interdistances; length femur I 2.24–2.47 \times carapace width, palpal femur 0.62–0.71 \times carapace width; atrium length 1.0–1.12 \times width, spermathecae 0.75–0.82 \times atrium width.

Natural history.—These spiders were found under moist rocks on a loose granitic slope. Individuals hung beneath tightly woven sheet webs 3–4 cm in diameter (Fig. 1).

Distribution.—Known only from the type locality (Fig. 119).

Calileptoneta wapiti (Gertsch 1974)

Figs. 18, 35–37, 89–94, 120

Leptoneta wapiti Gertsch 1974: 195; Brignoli 1977: 217.

Calileptoneta wapiti (Gertsch): Platnick 1986: 15; Platnick 2002.

Type material.—Male holotype from Cameron Road, near Elk, Mendocino County, California, USA, 39°07'N, 123°43'W, 16 February 1967, V. Roth (AMNH, examined).

Other material examined.—USA: California: Mendocino County: Mendocino, 39°18'N, 123°47'W, 4 January 1958, J. P. Helfer (1 ♂, AMNH).

Diagnosis.—Distinguished from other *Calileptoneta*, except *C. noyoana*, by having males with retrolateral twisted tarsal setae on

the palpus (Figs. 37, 92) and an enlarged distal cheliceral tooth (Fig. 18); from *C. noyoana* by having a short palpal femur, $0.63\text{--}1.0 \times$ carapace width.

Male (holotype).—Total length 1.91. Specimen faded. Carapace and all appendages yellow-brown.

Carapace 1.31 long, 0.79 wide, height at fovea $0.38 \times$ carapace width; clypeus 0.19 high, chelicerae 0.63 long, fang furrow with 7 teeth on a narrow ridge and 3 denticles on retro-margin (Fig. 18). Ocular area 0.22 long, 0.18 wide; diameter PME $0.05 \times$ PLE interdistances. Sternum 0.59 long, 0.57 wide; labium 0.10 long, 0.15 wide; palpal coxae 0.46 long, 0.19 wide.

Spination: palpus: patella d1; tibia r1-1. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $1.78 + 0.29 + 1.90 + 1.49 + 0.98 = [6.44]$; II: $1.80 + 0.29 + 1.44 + 1.20 + 0.80 = [5.53]$; III: $1.15 + 0.27 + 1.07 + 1.02 + 0.73 = [4.24]$; IV: $1.49 + 0.24 + 1.46 + 1.29 + 0.85 = [5.33]$; pedipalpus: $0.78 + 0.29 + 0.42 + 0.36 = [1.85]$. Femur I $2.25 \times$ carapace width, palpal femur $1.0 \times$ carapace width.

Palpal bulb (Figs. 89–94) 0.45 long, 0.27 wide; retroapical seta proximally broad and tapering to a point distally; embolus broadly forked at apex; paraembolar setae circular, reaching to base of fork on embolus; accessory lobe small (Fig. 94).

Abdomen dark, without chevron pattern, 1.16 long, 0.91 wide.

Variation ($n = 2$).—Total length 1.91; carapace length $1.20\text{--}1.66 \times$ carapace width; OAL $1.22\text{--}1.36 \times$ OAW, diameter PME $0.50\text{--}0.75 \times$ PLE interdistances; length femur I $2.09\text{--}2.25 \times$ carapace width, palpal femur $0.67\text{--}1.0 \times$ carapace width, bulb length $1.0\text{--}1.07 \times$ palpal tibia length.

Female.—Unknown.

Natural history.—Trips to relocate this rare species have proven unsuccessful. Specimens originally determined as *C. wapiti* by Gertsch (1974) were females and juveniles with no diagnostic features. Furthermore, these specimens fit into the geographical range of *C. helferi* and *C. noyoana* (Fig. 120). Due to the difficulty in the determination of females and the sympatric distribution of these species in Mendocino County, no female specimens are currently assigned to *C. wapiti*.

Distribution.—Mendocino County, Northern California (Fig. 120).

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I would like to dedicate this study to the memory of Dr. Willis Gertsch, discoverer of many remarkable spider taxa throughout North America, and an inspiration to generations of American arachnologists.

A draft of this manuscript was critically read by James Cokendolpher, Charles Griswold, Bob Patterson, Greg Spicer and Darrell Ubick.

LITERATURE CITED

- Banks, N. 1904. Some Arachnida from California. Proceedings of the California Academy of Sciences (3rd ser.) 3:331–337.
 Banks, N. 1910. Catalogue of nearctic spiders. U.S. National Museum Bulletin 72:1–80.
 Brignoli, P.M. 1972. Some cavernicolus spiders

- from Mexico (Araneae), in "Subterranean fauna of Mexico, Part I". *Quaderna Accademia Nazionale dei Lincei* 171:129–155.
- Brignoli, P.M. 1974. Notes on spiders, mainly cave-dwelling, of Southern Mexico and Guatemala. *Quaderna Accademia Nazionale dei Lincei* 171(2):195–238.
- Brignoli, P.M. 1975. Ueber die Gruppe der Haplogynae. Proceedings of the 6th International Arachnology Congress (Amsterdam 1974), pp. 33–38.
- Brignoli, P.M. 1976. Ragni di Grecia IX. Specie nuove o interessanti delle famiglie Leptonetidae, Dysderidae, Pholcidae ed Agelenidae. *Revue Suisse de Zoologie* 83:539–578.
- Brignoli, P.M. 1977. Spiders from Mexico, III. A new leptonetid from Oaxaca, in "Subterranean fauna of Mexico, Part III". *Quaderna Accademia Nazionale dei Lincei* 171:213–218.
- Brignoli, P.M. 1979a. On some cave spiders from Guatemala and United States (Araneae). *Revue Suisse de Zoologie* 86:435–443.
- Brignoli, P.M. 1979b. Ragni d' Italia XXXI. Specie cavernicole nuove o interessanti. *Quaderni Periodico del Museo di Speleologica "V. Rivera"*, Anno V N° 10 Dicembre 1979.
- Brignoli, P.M. 1979c. The morphology and the relationships of the Leptonetidae (Arachnida, Araneae). *Journal of Arachnology* 7:231–236.
- Chamberlin, R.V. & W. Ivie. 1942. A hundred new species of American spiders. *Bulletin of the University of Utah, Biological Series* 7:1–117.
- Coddington, J.A. 1983. A temporary slide mount allowing precise manipulation of small structures. *Verhandlungen des Naturwissenschaftlichen Vereins In Hamburg* 26:291–292.
- Coddington, J.A. 1989. Spinneret silk morphology: evidence for the monophyly of orb-weaving spiders, Cyrtophorinae (Araneae), and the group Theridiidae plus Nesticidae. *Journal of Arachnology* 17:71–95.
- Comstock J.H. 1913. *The Spider Book*. 721 pp. Cornell University Press, Ithaca, NY.
- Fage, L. 1913. Etudes sur les araignees cavernicoles, II. Revision des Leptonetidae. *Biospeologica, Archives de Zoologie Experimentale et Generale* (5 série) 10:479–576.
- Gertsch, W.J. 1935. Spiders of the southwestern United States with descriptions of new species. *American Museum Novitates* 792:1–31.
- Gertsch, W.J. 1974. The spider family Leptonetidae in North America. *Journal of Arachnology* 1: 145–203.
- Machado, A. De Barros. 1941. Araignees nouvelles pour la faune portugaise II. *Pub. Inst. Zool. "Augusto Nobre"*. *Fac. Cienc. do Porto* 3:1–60.
- Machado, A. De Barros. 1945. A propos de l'appareil respiratoire des "Leptonetidae" (Araneae). *Pub. do Mus. Zool. do Porto* 23:131–135.
- Moles, M.L. 1921. A list of California Arachnida: VII. Araneida or True Spiders. *Journal of Entomology and Zoology, Claremont* 13:39–45.
- Platnick, N.I. 1986. On the tibial and patellar glands, relationships, and American genera of the spider family Leptonetidae (Arachnida, Araneae). *American Museum Novitates* 2855:1–16.
- Platnick, N.I. 2002. The world spider catalog. Maintained by the American Museum of Natural History at: <http://research.amnh.org/entomology/spiders>.
- Platnick, N.I., Coddington, J.A., Forster, R.R., Griswold, C.E. 1991. Spinneret morphology and the phylogeny of haplogyne spiders. *American Museum Novitates* 3016:1–73.

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